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Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions

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MAURICE H. STANS, *Secretary*
NATIONAL BUREAU OF STANDARDS · A. V. ASTIN, *Director*

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Foreword

The National Standard Reference Data System is a Government-wide effort to provide for the technical community of the United States effective access to the quantitative data of physical science, critically evaluated and compiled for convenience, and readily accessible through a variety of distribution channels. The System was established in 1963 by action of the President's Office of Science and Technology and the Federal Council for Science and Technology.

The responsibility to administer the System was assigned to the National Bureau of Standards and an Office of Standard Reference Data was set up at the Bureau for this purpose. Since 1963, this Office has developed systematic plans for meeting high-priority needs for reliable reference data. It has undertaken to coordinate and integrate existing data evaluation and compilation activities (primarily those under sponsorship of Federal agencies) into a comprehensive program, supplementing and expanding technical coverage when necessary, establishing and maintaining standards for the output of the participating groups, and providing mechanisms for the dissemination of the output as required.

The System now comprises a complex of data centers and other activities, carried on in Government agencies, academic institutions, and nongovernmental laboratories. The independent operational status of existing critical data projects is maintained and encouraged. Data centers that are components of the NSRDS produce compilations of critically evaluated data, critical reviews of the state of quantitative knowledge in specialized areas, and computations of useful functions derived from standard reference data. In addition, the centers and projects establish criteria for evaluation and compilation of data and make recommendations on needed modifications or extensions of experimental techniques.

Data publications of the NSRDS take a variety of physical forms, including books, pamphlets, loose-leaf sheets and computer tapes. While most of the compilations have been issued by the Government Printing Office, several have appeared in scientific journals. Under some circumstances, private publishing houses are regarded as appropriate primary dissemination mechanisms.

The technical scope of the NSRDS is indicated by the principal categories of data compilation projects now active or being planned: nuclear properties, atomic and molecular properties, solid state properties, thermodynamic and transport properties, chemical kinetics, colloid and surface properties, and mechanical properties.

An important aspect of the NSRDS is the advice and planning assistance which the National Research Council of the National Academy of Sciences-National Academy of Engineering provides. These services are organized under an overall Review Committee which considers the program as a whole and makes recommendations on policy, long-term planning, and international collaboration. Advisory Panels, each concerned with a single technical area, meet regularly to examine major portions of the program, assign relative priorities, and identify specific key problems in need of further attention. For selected specific topics, the Advisory Panels sponsor subpanels which make detailed studies of users' needs, the present state of knowledge, and existing data resources as a basis for recommending one or more data compilation activities. This assembly of advisory services contributes greatly to the guidance of NSRDS activities.

The NSRDS–NBS series of publications is intended primarily to include evaluated reference data and critical reviews of long-term interest to the scientific and technical community.

A. V. Astin, *Director.*

Contents

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This is a compilation of ionization and appearance potentials of positive ions published from 1955 through June 1966. The compilation lists the ion formed, the parent species from which it was formed, the other products of the process, the threshold energy for the formation of this ion, and the method by which this data was obtained.

Where feasible, the heat of formation at 298 K of the positive ion has been computed for each entry using auxiliary thermochemical data. From these computed values "best" values have been chosen.

Key Words: Appearance potential; compilation; data; heat of formation; ionization potential; ions; positive ions.

1. Introduction

1.1. General

Since the publication of "Electron Impact Phenomena and the Properties of Gaseous Ions" by F. H. Field and J. L. Franklin [1],[1] which contained a compilation of ionization and appearance potentials reported through 1955, the study of gaseous ionization phenomena has undergone an explosive growth in the number and variety of pertinent research studies. This field now includes aspects of vacuum ultraviolet spectroscopy, inelastic electron scattering, photoionization, photoelectron spectroscopy, mass spectrometry, charge exchange, and theoretical chemistry.

The present volume is intended to cover the literature published since 1955. It is our hope that it will serve several purposes. First, it will present essentially all of the values of appearance potentials of positive ions obtained since 1955; second it will provide a set of "best" values of heats of formation of gaseous ions; third, it will serve as a guide to the literature.

As there is considerable variation in the quality of the data in this field it would have been simpler to include only the well-determined numbers. However, in some cases the only values available were obtained by imprecise methods, and in the belief that an approximate value is better than none we decided to include all available data in the compilation.

1.2. Literature Coverage

Literature references were obtained initially from unpublished annual bibliographies compiled by volunteers for ASTM Committee E–14 on Mass Spectrometry, the compilations of Kiser [2], bibliographies published in "Advances in Mass Spectrometry" [3], references given in various review articles, and since 1964, by scanning "Current Content, Physical Sciences" and "Physics Abstracts." The cutoff data was June 30, 1966. We feel that coverage is reasonably thorough for experimental papers but rather spotty for theoretical and semiempirical treatments.

[1] Figures in brackets indicate the literature references on page 4.

1.3. Order of Presentation

The heart of this work is table 1, which gives ionization potentials, appearance potentials, probable mechanisms, the method by which the data was obtained, and computed heats of formation of the various positive ions. The order of presentation of the ions is that of increasing atomic number (except for the rare gases, which are given together) and molecular complexity. Section 2, "Order of Presentation," lists the ions and the order and page of their appearance.

For each ion, the various processes of ion formation are arranged in order of increasing complexity, and for each order of complexity, in order of decreasing reliability of method. Thus direct ionization processes are given before fragmentation processes and spectroscopic measurements before electron impact measurements. The mechanisms listed are usually, but not necessarily, those given in the original paper. Where more than one neutral product is proposed, we have usually considered the mechanism to be too speculative to warrant using the resulting heat of formation in arriving at a "best" value. Appearance potentials are given along with the investigator's estimate of the precision of their measurements. These are usually average deviations from the average appearance potential and in no sense limits of accuracy of the measurement.

The method of measurement is indicated in an abbreviated form along with each appearance potential. Table A lists the abbreviations, their meaning, and at least one reference in which the method is discussed in some detail. Theoretical calculations are included for completeness. The table also includes an estimate of the reliability of the methods, which is discussed later.

For most measurements for which a reasonably unambiguous mechanism could be devised by either the investigator or, in a few instances, ourselves, a heat of formation of the product ion has been computed and listed in table 1. This calculation will be discussed below. In some instances where the heat of formation of the ion is well established but that of the neutral species, either reactant or product, is not, we have computed the heat of formation of the neutral. The heats of formation of the neutrals thus determined are collected for convenience in table 2.

Finally, for each appearance potential given in table 1, a numerical reference to the bibliography of appearance potentials is listed. This bibliography follows table 2. The numbers were assigned in the order in which the papers were read and, to simplify the problem of seeking results by a particular author, an author index is included.

TABLE A. *Experimental techniques*

Abbreviation	Method	Reference	Estimated precision in measurement of—	
			IP(eV)	AP(eV)
S	Optical spectroscopy	27	±0.01	–
PI	Photoionization	19, 20–24	±0.01	±0.05
EM	Electron monochromator	9, 10	±0.05	±0.05
RPD	Retarding potential difference.	25, 26	±0.05	±0.1
PE	Photoelectron spectroscopy.	16, 17, 18	±0.1	–
SI	Surface ionization	29	±0.1	–
CS	Critical slope	4	±0.2	±0.3
SL	Semi-log plot	8, 28	±0.2	±0.3
EVD	Extrapolated voltage difference.	1, 8, 11	±0.2	±0.3
FDP	First differential plot	12	±0.2	±0.3
MSD	Morrison 2nd differential plot.	12	±0.2	±0.3
VC	Vanishing current or initial break.	1, 8	±0.2	±0.3
VDF	Voltage difference at fixed percent of ion current at standard intensity.	7, 28	±0.3	±0.4
EC	Energy compensation	7, 8	±0.3	±0.5
LE	Linear extrapolation	1, 8	±0.4	±0.5
NRE	N'th root extrapolation	13, 14, 15	?	?
CTS	Charge transfer spectra	5, 6	?	–
TC	Theoretical calculation	8	?	–
NS	Unspecified electron impact method.	–	–	–
D	Derived	–	–	–

1.4. Reliability of Data and Criteria for Evaluation

As noted above, the basic information is of quite variable quality. The responsibility for this rests partly with the molecules and partly with the experiments and their interpretation. A detailed discussion of these factors will not be given here; some pertinent review articles are cited in references [1, 30, 31]. The following general remarks are offered. Above the ionization threshold there exists a wide variety of cross-section behavior both for atoms and molecules. In the former case an important factor is autoionization from Rydberg levels leading to electronically excited states of the ions. For molecules, in addition, there may be differences between the equilibrium configuration of the molecule and the molecule ion. Because of the Franck-Condon principle this produces additional vibrational structure in the cross-section curve. Thus, in some cases doubt arises as to whether the ionization

onset corresponds to an ion without vibrational excitation.

Turning to the experimental techniques, the identification of a molecular Rydberg series, together with investigation of vibrational structure by isotopic substitution almost always leads to a very good value for ionization potentials. Although such data have been obtained for ammonia and ethylene, for example, no corresponding structure has yet been found in the absorption spectrum of many other molecules including oxygen and methane. In photoionization, molecule ions formed with only small equilibrium geometry changes produce sharp photoionization thresholds; whereas molecules having featureless absorption spectra yield gradually rising photoionization curves which are difficult to interpret.

The various electron impact techniques are somewhat poorer because some suffer from lack of an absolute energy scale and some from a wide energy spread in the electron beam, or both. Furthermore a sharp onset at the ionization threshold is not predicted by theory or experimentally observed. Thus, the majority of the methods employing electron impact use a calibrating gas (usually argon) to fix the energy scale with the hope that the cross-section behavior of argon and the molecule under study are not too dissimilar. Examination of the tables will show that for ionization potentials the results in the best cases are frequently, but not always, within a few tenths of a volt or better of the spectroscopic onset.

Because of the widespread occurrence of autoionization, the determination of higher ionization potentials is far more difficult. Reliable information has been obtained essentially only from those vacuum ultraviolet absorption spectra which have yielded identifiable higher Rydberg spectra and from the recently developed technique of photoelectron spectroscopy, which eliminates interference from autoionization. Higher ionization potentials are very difficult to identify in photoionization curves or from electron impact studies.

The determinations of energy thresholds for fragmentation processes suffer the same difficulties as determinations of ionization thresholds. In addition, some fragmentation processes involve production of fragment ions with kinetic energy or electronic excitation. In only a few cases have such phenomena been clearly identified and studied. However, in large molecules experience suggests that these factors may not be very significant and that reasonable thermochemical quantities may be derived from the threshold data. On the basis of existing data it is to be expected that in many, but by no means all cases, fragmentation threshold energies obtained by photoionization will be up to 0.5 eV lower than those determined by electron impact. Unfortunately relatively few appearance potentials of fragment ions have been obtained by photoionization methods so that we must rely to a large extent upon electron impact determinations.

These considerations have led us to the evaluation of the reliability of the various methods given in table A. This ordering has been a significant basis of the choosing of "best" values. The placement of theoretical calculations was difficult and perhaps incorrect, but reflects our feeling that, at present, theoretical calculations have only moderate predictive value.

It should be emphasized that this table is intended as a general guide to the current reliability of these methods. Some measurements will be better and others worse than indicated in this table.

1.5. Thermochemical Considerations

The heats of formation of ions presented here do not represent equilibrium thermochemical properties. They are the results of measurements on isolated molecules, and were arrived at by employing known heats of formation of neutral species in conventional thermochemical equations employing the measured appearance potential as the heat of reaction. Evidently this treatment is not rigorous. Unfortunately at this time it would be impractical and usually impossible to derive rigorously correct equilibrium values from available information and in many instances the quality of the data does not justify such treatment. Furthermore, the temperature at which the measurements were made is not usually known. Thus although spectroscopic measurements refer to processes at 0 K, photon impact measurements are normally carried out at about 300 K, and electron impact measurements at temperatures considerably greater than 300 K.

Fortunately the temperature effect is not large, and accordingly we have treated all the reported ionization and appearance potentials as heats of reaction at 298 K. The heat of formation of the electron has been taken to be zero at all temperatures.

In computing heats of formation from appearance potentials it is of course necessary to know the heats of formation of the appropriate neutral species. When possible we have taken these from standard compilations, notably Technical Note 270–3 [32] and Circular 500 [33] of the National Bureau of Standards, The JANAF Tables [34] and the API Tables of Thermodynamic Properties of Hydrocarbons [35]. Otherwise, the data was taken from research papers. Unfortunately, values were not always available and in a number of cases we have resorted to the method of Franklin [36] for estimating heats of formation.

1.6. Selection of "Best" Values

Wherever possible we have given our conclusion as to the most reliable heat of formation of an ion. In choosing the heats of formation to be assigned to the various ions we were forced to rely heavily upon internal consistency of the measurements on a given ion and on subjective criteria.

In general, values derived from spectroscopic or photon impact measurements have been given greatest weight, as were values based on direct rather than dissociative ionization processes.

The values of the heats of formation used in arriving at a "best" value are labeled with an asterisk. In those cases where a large number of measurements were involved or where there was any degree of ambiguity, the heats of formation are given beside the formula for the ion in a separate heading preceding each set of data.

1.7. Units

The conversion factors used here are 1 eV = 96487.0J = 23060.9 cal.

1.8. Concluding Remarks

The authors recognize all too well that in a work of this scope there will be errors of omission and commission and that some choices of "best" values were more subjective than self-evident. We solicit comments, criticism, differences of opinion and additional factual information.

We thank Georgia L. Apostolou, Emma Lou Bageant, Wilma Bell, Robert Cobb, Deborah Ann Copes and William A. Seitz for their assistance in the preparation of this compilation. Our special thanks go to Frederic N. Harllee, who contributed much energy and imagination to the initial phases of this project, to Dr. D. Garvin and J. Hilsenrath for numerous helpful suggestions and to Dr. S. Rossmassler and Dr. E. L. Brady for support and encouragement.

1.9. References

[1] Field, F. H., and Franklin, J. L., Electron Impact Phenomena and the Properties of Gaseous Ions (Academic Press, New York, 1957).
[2] Kiser, R. W., Tables of Ionization Potentials, U.S. Atomic Energy Commission, Office of Technical Information, Report No. TID–6142, June 20, 1960, and Supplement, June 20, 1962.
[3] For the most recent see Advances in Mass Spectrometry, Vol. **3**, The Institute of Petroleum, London, 1966.
[4] Wahrhaftig, A. L., The theory of mass spectra and the interpretation of ionization efficiency curves, in Application of Mass Spectrometry to Organic Chemistry, R. I. Reed, Ed. (Academic Press, New York, 1966).
[5] Mulliken, R. S., J. Am. Chem. Soc. **74**, 811 (1952).
[6] Collin, J., Z. Electrochem. **64**, 936 (1960).
[7] Kiser, R. W., and Gallegos, E. J., J. Phys. Chem. **66**, 947 (1962).
[8] Kiser, R. W., Introduction to Mass Spectrometry and Its Applications (Prentice-Hall, Inc., Englewood Cliffs, N.J., 1965).
[9] Marmet, P., and Kerwin, L., Can. J. Phys. **38**, 787 (1960).
[10] Brion, C. E., Frost, D. C., and McDowell, C. A., J. Chem. Phys. **44**, 1034 (1966).
[11] Warren, J. W., Nature **165**, 810 (1950).
[12] Morrison, J. D., J. Chem. Phys. **21**, 1767 (1953).
[13] Morrison, J. D., and Nicholson, A. J. C., J. Chem. Phys. **31**, 1320 (1959).
[14] Dorman, F. H., Morrison, J. D., and Nicholson, A. J. C., J. Chem. Phys. **31**, 1335 (1959).
[15] Dorman, F. H., and Morrison, J. D., J. Chem. Phys. **35**, 575 (1961).
[16] Al-Joboury, M. I., and Turner, D. W., J. Chem. Phys. **37**, 3007 (1962).
[17] Al-Joboury, M. I., and Turner, D. W., J. Chem. Soc. 5141 (1963).
[18] Al-Joboury, M. I., and Turner, D. W., J. Chem. Soc. 4434 (1964).
[19] Hurzeler, H., Inghram, M. G., and Morrison, J. D., J. Chem. Phys. **28**, 76 (1958).
[20] Watanabe, K., J. Chem. Phys. **22**, 1564 (1954).
[21] Watanabe, K., Nakayama, T., and Mottl, J., J. Quant. Spectrosc. Radiat. Transfer **2**, 369 (1962).
[22] Lossing, F. P., and Tanaka, I., J. Chem. Phys. **25**, 1031 (1956).
[23] Weissler, G. L., Sampson, J. A. R., Ogawa, M., and Cook, G. R., J. Opt. Soc. Am. **49**, 338 (1959).
[24] Dibeler, V. H., and Reese, R. M., J. Res. NBS **A68** (Phys. and Chem.) No. 4, 409 (1964).
[25] Fox, R. E., Hickam, W. M., Grove, D. J., and Kjeldaas, T., Rev. Sci. Instr. **26**, 1101 (1955).
[26] Fox, R. E., Hickam, W. M., and Kjeldaas, T., Phys. Rev. **89**, 555 (1953).
[27] Herzberg, G., Molecular Spectra and Molecular Structure, Vol. **III** (D. Van Nostrand Co., Inc., Princeton, N.J., 1966).
[28] Lossing, F. P., Tickner, A. W., and Bryce, W. A., J. Chem. Phys. **19**, 1254 (1951).
[29] Bakulina, I. N., and Ionov, N. I., Zh. Eksperim. i Teor. Fiz. **36**, 1001 (1959).
[30] Krauss, M., and Dibeler, V. H., Appearance potential data of organic molecules, in Mass Spectrometry of Organic Ions, F. W. McLafferty, Ed. (Academic Press, New York, 1963).
[31] McDowell, C. A., The ionization and dissociation of molecules, ch. XII of Mass Spectrometry, C. A. McDowell, Ed. (McGraw-Hill Book Co., Inc., New York, 1963).
[32] Wagman, D. D., Evans, W. H., Parker, V. B., Halow, I., Bailey, S. M., and Schumm, R. H., National Bureau of Standards Technical Note 270–3, U.S. Government Printing Office, Washington, D.C. 20402 (1968).
[33] Rossini, F. D., Wagman, D. D., Evans, W. H., Levine, S., and Jaffe, I., National Bureau of Standards Circular 500, U.S. Government Printing Office, Washington, D.C. 20402 (1952).
[34] JANAF Thermochemical Tables, The Dow Chemical Company, Midland, Michigan.
[35] Rossini, F. D., Pitzer, K. S., Arnett, R. L., Braun, R. M., and Pimentel, G. C., Selected Values of Physical and Thermodynamic Properties of Hydrocarbons and Related Compounds (Carnegie Press, Pittsburgh, 1953).
[36] Franklin, J. L., Ind. Eng. Chem. **41**, 1070 (1949).

2. Order of Ion Presentation

The ions in table 1 are arranged in this order: hydrogen first, the rare gases, and then the remaining elements in order of increasing atomic number. Molecules containing two or more elements are found under the element of highest atomic number, except for the rare gas halides, which are listed under the halogens.

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

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3. TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions

Computed heats of formation used in arriving at a recommended value are indicated with an asterisk. Where only one such value is so indicated and there is no ambiguity as to the structure of the ion, this corresponds to the recommended value. In those cases where the recommended value is based on the average of several measurements or where there is any ambiguity as to the structure of the ion, the recommended values are listed in a separate heading preceding each set of data.

The letters (a) and (b) indicate that the heat of formation of a neutral reactant or product has been calculated instead of that of an ion. These are listed separately in table 2.

All cyclic reactants are named.

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
H^+ Heat of formation 366 kcal mol^{-1}						
H^+	H		13.598	S	366*	2113
H^+	H		13.5 ± 0.2	NS	363	87
(EI on neutral fragment from benzene)						
H^+	H		13.6 ± 0.2	NS	366	87
(EI on neutral fragment from n-C_4H_{10})						
H^+	H_2	H^-	17.3	VC		200
H^+	C_3H_8		20.0 ± 0.3	VC		1408
H^+	C_3H_8		22.0 ± 0.5	VC		1408
H^+	HF	F^-	15.9	RPD		286
H^+	HCl	Cl^-	14.5	RPD		199
D^+ Heat of formation 367 kcal mol^{-1}						
D^+	D		13.602	S	367*	2113
D^+	D_2		25.3 ± 0.2	SRP		1264
(Excess KE ion)						
H_2^+ Heat of formation 356 kcal mol^{-1}						
H_2^+	H_2		15.427 ± 0.002	S	356*	2095
H_2^+	H_2		15.42 ± 0.01	PI	356	1118, 1143
H_2^+	H_2		15.3 ± 0.3	PI	353	230
H_2^+	H_2		15.41	PE	355	248
H_2^+	H_2		15.44 ± 0.01	PE	356	1050
H_2^+	H_2		15.50 ± 0.03	RPD	357	1012
H_2^+	H_2		15.4	RPD	355	1121
H_2^+	H_2		17.3 ± 0.2	RPD		119
H_2^+	H_2		15.51 ± 0.10	CS	358	383
H_2^+	H_2		15.43	MSD	356	1251
H_2^+	C_3H_8		16.4 ± 0.5	VC		1408
H_2^+	C_3H_8		25.7 ± 0.5	VC		1408
H_2^+	C_3H_8		27.6 ± 0.5	VC		1408
HD^+ Heat of formation 356 kcal mol^{-1}						
HD^+	HD		15.46	PI	356*	1143
D_2^+ Heat of formation 356 kcal mol^{-1}						
D_2^+	D_2		15.46 ± 0.01	PI	356*	1118, 1143
D_2^+	D_2		15.5	RPD	357	1121

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
He^+ Heat of formation 567 kcal mol^{-1}						
He^+	He		24.586 ± 0.002	S	567*	2113
He^+	He		24.6 ± 0.1	PI	567	163
He^+	He		24.59 ± 0.03	RPD	567	1012
He^+	He		24.65 ± 0.1	FDP	568	1051
He^+	He		24.65 ± 0.1	FDP	568	1172
He^+	He		24.53 ± 0.08	LE	566	2032
Ne^+ Heat of formation 497 kcal mol^{-1}						
Ne^+	Ne		21.564	S	497*	2113
Ne^+	Ne		21.8 ± 0.5	PI	503	163
Ne^+	Ne		21.52 ± 0.03	RPD	496	1012
Ne^+	Ne		21.61 ± 0.2	EVD	498	52
Ne^+	Ne		21.75 ± 0.3	EVD	502	52
Ne^+	Ne		21.62 ± 0.05	CS	499	383
Ne^+	Ne		21.75 ± 0.05	FDP	502	1051
Ne^+	Ne		21.75 ± 0.05	FDP	502	1172
Ne^+	Ne		21.60 ± 0.08	LE	498	2032
Ne^{+2} Heat of formation 1445 kcal mol^{-1}						
Ne^{+2}	Ne		62.64	S	1445*	2113
Ne^{+2}	Ne		62.5	LE	1441	1240
Ne^{+3} Heat of formation 2906 kcal mol^{-1}						
Ne^{+3}	Ne		126	S	2906*	2113
Ne^{+3}	Ne		129	LE	2975	1240
Ne^{+4} Heat of formation 5166 kcal mol^{-1}						
Ne^{+4}	Ne		224	S	5166*	2113
Ne^{+4}	Ne		246	LE	5673	1240
Ne^{+5} Heat of formation 8071 kcal mol^{-1}						
Ne^{+5}	Ne		350	S	8071*	2113
Ne^{+5}	Ne		900	LE	20755	1240
$Ar^+(^2P_{3/2})$ Heat of formation 363 kcal mol^{-1} **$Ar^+(^2P_{1/2})$ 368 kcal mol^{-1}**						
$Ar^+(^2P_{3/2})$	Ar		15.759	S	363*	2113
$Ar^+(^2P_{3/2})$	Ar		15.74	PI	363	2034
$Ar^+(^2P_{3/2})$	Ar		15.76 ± 0.01	PI	363	1118
$Ar^+(^2P_{3/2})$	Ar		15.76	PI	363	2200
$Ar^+(^2P_{3/2})$	Ar		15.7 ± 0.1	PI	362	230
$Ar^+(^2P_{3/2})$	Ar		15.79	PE	364	248
$Ar^+(^2P_{3/2})$	Ar		15.74 ± 0.2	RPD	363	224
Ar^+	Ar		15.60 ± 0.2	EVD	360	52
Ar^+	Ar		15.720	LE	363	35
Ar^+	Ar		15.739	LE	363	35
Ar^+	Ar		15.83 ± 0.08	LE	365	3
Ar^+	Ar		15.83 ± 0.08	LE	365	2032

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$Ar^+(^2P_{1/2})$	Ar		15.937	S	368*	2113
$Ar^+(^2P_{1/2})$	Ar		15.93	PI	367	1118
$Ar^+(^2P_{1/2})$	Ar		15.94	PI	368	2200
$Ar^+(^2P_{1/2})$	Ar		15.95	PI	368	2034
$Ar^+(^2P_{1/2})$	Ar		16.0 ± 0.2	PI	369	163
$Ar^+(^2P_{1/2})$	Ar		15.93	PE	367	248
Ar^{+2} Heat of formation 1001 kcal mol^{-1}						
Ar^{+2}	Ar		43.39	S	1001*	2113
Ar^{+2}	Ar		43.4 ± 0.3	RPD	1001	198
Ar^{+2}	Ar		43.3	NRE	999	211
Ar^{+2}	Ar		43	LE	992	1240
Ar^{+3} Heat of formation 1944 kcal mol^{-1}						
Ar^{+3}	Ar		84.30	S	1944*	2113
Ar^{+3}	Ar		84.8 ± 0.5	RPD	1956	198
Ar^{+3}	Ar		83.7 ± 0.5	NRE	1930	25
Ar^{+3}	Ar		84.0	NRE	1937	211
Ar^{+3}	Ar		84.3	LE	1944	1040
Ar^{+3}	Ar		85	LE	1960	1240
Ar^{+4} Heat of formation 3323 kcal mol^{-1}						
Ar^{+4}	Ar		144.1	S	3323*	2113
Ar^{+4}	Ar		150.0 ± 5	RPD	3459	198
Ar^{+4}	Ar		147	LE	3390	1240
Ar^{+5} Heat of formation 5053 kcal mol^{-1}						
Ar^{+5}	Ar		219.1	S	5053*	2113
Ar^{+5}	Ar		285	LE	6572	1240
Ar^{+6} Heat of formation 7158 kcal mol^{-1}						
Ar^{+6}	Ar		310.4	S	7158*	2113
Ar^{+6}	Ar		430	LE	9916	1240
$Kr^+(^2P_{3/2})$ Heat of formation 323 kcal mol^{-1}						
$Kr^+(^2P_{1/2})$ 338 kcal mol^{-1}						
$Kr^+(^2P_{3/2})$	Kr		13.999	S	323*	2113
$Kr^+(^2P_{3/2})$	Kr		13.999 ± 0.002	PI	323	1253
$Kr^+(^2P_{3/2})$	Kr		14.01 ± 0.01	PI	323	1118
$Kr^+(^2P_{3/2})$	Kr		14.05	PE	324	248
$Kr^+(^2P_{3/2})$	Kr		14.00 ± 0.02	RPD	323	224
$Kr^+(^2P_{3/2})$	Kr		14.00 ± 0.03	RPD	323	1012
Kr^+	Kr		14.01 ± 0.03	SL	323	1047
Kr^+	Kr		13.979	LE	322	35
Kr^+	Kr		14.012	LE	323	35
Kr^+	Kr		14.01 ± 0.08	LE	323	2032
Kr^+ (Autoionizing level?)	Kr		14.35 ± 0.1	RPD	331	224
$Kr^+(^2P_{1/2})$	Kr		14.665	S	338*	2113
$Kr^+(^2P_{1/2})$	Kr		14.69 ± 0.01	PI	339	1118
$Kr^+(^2P_{1/2})$	Kr		14.69	PE	339	248
$Kr^+(^2P_{1/2})$	Kr		14.70 ± 0.1	RPD	339	224

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
Kr^{+2} Heat of formation 889 kcal mol^{-1}						
Kr^{+2}	Kr		38.57	S	889*	2113
Kr^{+2}	Kr		38.45 ± 0.1	RPD	887	198
Kr^{+2}	Kr		38.5	VC	888	201
Kr^{+2}	Kr		38.5	VC	888	211
Kr^{+2}	Kr		38.1 ± 0.1	NRE	879	211
Kr^{+2}	Kr		38.0 ± 0.5	NRE	876	201
Kr^{+2}	Kr		38	LE	876	1240
Kr^{+3} Heat of formation 1741 kcal mol^{-1}						
Kr^{+3}	Kr		75.5	S	1741*	2113
Kr^{+3}	Kr		75.6 ± 0.5	RPD	1743	198
Kr^{+3}	Kr		77	VC	1776	211
Kr^{+3}	Kr		73.3 ± 0.2	NRE	1690	211
Kr^{+3}	Kr		76	LE	1753	1240
Kr^{+4}						
Kr^{+4}	Kr		130.0	VC	2998	201
Kr^{+4}	Kr		130	VC	2998	211
Kr^{+4}	Kr		147 ± 2	VC	3390	198
Kr^{+4}	Kr		118 ± 1	NRE	2721	211
Kr^{+4}	Kr		117.5 ± 2	NRE	2710	201
Kr^{+4}	Kr		134	LE	3090	1240
Kr^{+5}						
Kr^{+5}	Kr		195	VC	4497	211
Kr^{+5}	Kr		218 ± 10	VC	5027	198
Kr^{+5}	Kr		181 ± 2	NRE	4174	211
Kr^{+5}	Kr		204	LE	4704	1240
Kr^{+6}						
Kr^{+6}	Kr		310	VC	7149	211
Kr^{+6}	Kr		350 ± 10	VC	8071	198
Kr^{+6}	Kr		275 ± 10	NRE	6342	211
Kr^{+6}	Kr		302	LE	6964	1240
Kr^{+7}						
Kr^{+7}	Kr		470	LE	10839	1240
Kr^{+8}						
Kr^{+8}	Kr		670	LE	15451	1240
$Xe^{+}(^2P_{3/2})$ Heat of formation 280 kcal mol^{-1}						
$Xe^{+}(^2P_{1/2})$ 310 kcal mol^{-1}						
$Xe^{+}(^2P_{3/2})$	Xe		12.130	S	280*	2113
$Xe^{+}(^2P_{3/2})$	Xe		12.129 ± 0.002	PI	280	1032
$Xe^{+}(^2P_{3/2})$	Xe		12.12 ± 0.01	PI	279	1118
$Xe^{+}(^2P_{3/2})$	Xe		12.17	PE	281	248
$Xe^{+}(^2P_{3/2})$	Xe		12.05 ± 0.1	EVD	278	52

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
Xe^+	Xe		12.082	LE	279	35
Xe^+	Xe		12.120	LE	279	35
Xe^+	Xe		12.10 ± 0.08	LE	279	2032
Xe^+	Xe		12.0 ± 0.1	LE	277	2053
$Xe^+(^2P_{1/2})$	Xe		13.436	S	310*	2113
$Xe^+(^2P_{1/2})$	Xe		13.426 ± 0.007	PI	310	1032
$Xe^+(^2P_{1/2})$	Xe		13.44 ± 0.01	PI	310	1118
$Xe^+(^2P_{1/2})$	Xe		13.49	PE	311	248
Xe^+	XeF_2	$F + F^-$?	12.0 ± 0.1	LE	297	2053
Xe^+	XeF_4	$F_2 + F + F^-$?	12.4 ± 0.1	LE	280	2053
Xe^{+2} Heat of formation 769 kcal mol^{-1}						
Xe^{+2}	Xe		33.33	S	769*	2113
Xe^{+2}	Xe		33.3	VC	768	211
Xe^{+2}	Xe		33.5	VC	773	201
Xe^{+2}	Xe		33.5 ± 0.2	NRE	773	211
Xe^{+2}	Xe		33.3 ± 0.5	NRE	768	201
Xe^{+2}	Xe		33.5 ± 0.5	NRE	773	25
Xe^{+2}	Xe		33	LE	761	1240
Xe^{+2}	Xe		34.3 ± 0.5	NRE		25
Xe^{+2}	Xe		35.3 ± 0.5	NRE		25
Xe^{+3} Heat of formation 1508 kcal mol^{-1}						
Xe^{+3}	Xe		65.4	S	1508*	2113
Xe^{+3}	Xe		65.4	VC	1508	211
Xe^{+3}	Xe		66.5	VC	1534	201
Xe^{+3}	Xe		64.8 ± 0.5	NRE	1494	25
Xe^{+3}	Xe		64.8 ± 0.5	NRE	1494	211
Xe^{+3}	Xe		64.3 ± 1	NRE	1483	201
Xe^{+3}	Xe		65	LE	1499	1240
Xe^{+3}	Xe		67.3 ± 0.5	NRE		25
Xe^{+4}						
Xe^{+4}	Xe		107	VC	2468	201
Xe^{+4}	Xe		111	VC	2560	211
Xe^{+4}	Xe		107 ± 1	NRE	2468	25
Xe^{+4}	Xe		107 ± 1	NRE	2468	211
Xe^{+4}	Xe		103 ± 2	NRE	2375	201
Xe^{+4}	Xe		110	LE	2537	1240
Xe^{+5}						
Xe^{+5}	Xe		170	VC	3920	201
Xe^{+5}	Xe		171	VC	3943	211
Xe^{+5}	Xe		160 ± 1	NRE	3690	25
Xe^{+5}	Xe		160 ± 1	NRE	3690	211
Xe^{+5}	Xe		157 ± 3	NRE	3621	201
Xe^{+5}	Xe		172	LE	3966	1240
Xe^{+6}						
Xe^{+6}	Xe		246	VC	5673	211
Xe^{+6}	Xe		218 ± 1	NRE	5027	25
Xe^{+6}	Xe		218 ± 1	NRE	5027	211
Xe^{+6}	Xe		248	LE	5719	1240

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		Xe^{+7}				
Xe^{+7}	Xe		362	LE	8348	1240
		Xe^{+8}				
Xe^{+8}	Xe		535	LE	12337	1240
		Xe^{+9}				
Xe^{+9}	Xe		820	LE	18910	1240
		Li^+ Heat of formation 163 kcal mol^{-1}				
Li^+	Li		5.392	S	163*	2113
Li^+	Li		5.5 ± 0.3	LE	165	1112
Li^+	$(C_2H_5Li)_4$		14 ± 2	NS		1
Li^+	LiF	F	11.5	VC	167	2179
Li^+	LiCl	Cl	10.6	VC	169	2179
Li^+	LiBr	Br	9.9	VC	167	2179
Li^+	LiI	I	9.5 ± 0.3	VC	174	2001
Li^+	Li_2I_2?	LiI + I?	11.6 ± 0.3	VC	179	2001
		LiH^+				
LiH^+	LiH		7.81	TC	212	1093
LiH^+	LiH		7.91	TC	215	1093
		Be^+ Heat of formation 293 kcal mol^{-1}				
Be^+	Be		9.322	S	293*	2113
Be^+	Be		9.2 ± 0.2	VC	290	2141
Be^+	Be		9.3 ± 0.2	VC	293	1106
Be^+	BeF_2	2F	28.3 ± 1.0	VC	425	2142
Be^+	$BeCl_2$	2Cl	26	VC	456	2195
		B^+ Heat of formation 326 kcal mol^{-1}				
B^+	B		8.298	S	326*	2113
B^+	B		8.3	NS	326	1116
B^+	B_2H_6	$BH_3 + H + H_2$?	19.5 ± 0.2	SL	382	102
B^+	B_2H_6	$BH_3 + H + H_2$?	18.7 ± 0.1	VC	364	209
B^+	B_2H_6	$BH_3 + H + H_2$?	18.9 ± 0.2	VC	368	209
B^+	B_2D_6	$BD_3 + D + D_2$?	18.6 ± 0.1	VC	362	209
B^+	$(CH_3)_3B$		23.1 ± 0.3	SL		364
B^+	$(C_2H_5)_3B$		30.1 ± 0.5	SL		364
B^+	$(CH_3O)_2BH$		23.4 ± 0.5	SL		364
B^+	$(CH_3O)_3B$		31.6 ± 1.0	SL		364
B^+	BF_3	3F	30.6 ± 1	EVD	377	440
B^+	BF_3	3F	30.1 ± 0.5	SL	366	364
B^+	BF_3	3F	31.3 ± 0.4	VC	393	40
B^+	BCl	Cl	13.6 ± 0.2	LE	320	440
B^+	BCl_3	3Cl	22.35 ± 0.06	EVD	332	440
B^+	BCl_3	$Cl_2 + Cl$	19.5 ± 1.0	SL	324	364
B^+	BCl_3	$Cl_2 + Cl$	19.5 ± 0.2	VC	324	206
B^+	BCl_3		20.8 ± 0.5	VC		206
B^+	BCl_3		18.4 ± 0.2	LE		440
B^+	BBr_3	3Br	19.6 ± 0.2	VC	323	206
B^+	BI_3	3I	16.6 ± 0.5	VC	323	206

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		B_2^+				
B_2^+	B_2H_6	$2H_2+2H$?	26.3 ± 0.5	SL	511	102
B_2^+	B_2H_6	$3H_2$	21.1 ± 0.1	VC	495	209
B_2^+	B_2D_6	$3D_2$	21.8 ± 0.2	VC	511	209
		BH^+ Heat of formation 333 kcal mol^{-1}				
BH^+	BH		9.77 ± 0.05	S	333*	1109
BH^+	B_2H_6		16.6 ± 0.2	SL		102
BH^+	B_2H_6	$2H_2+H$	14.9 ± 0.1	VC	300	209
BH^+	$(CH_3O)_2BH$		28.3 ± 2.0	SL		364
		BD^+				
BD^+	B_2D_6	$2D_2+D$	14.8 ± 0.1	VC		209
		BH_2^+				
BH_2^+	BH_2		9.8 ± 0.2	SL	274	2030
BH_2^+	B_2H_6		13.5 ± 0.5	SL		102
BH_2^+	B_2H_6		13.4 ± 0.1	VC		209
		BD_2^+				
BD_2^+	B_2D_6		13.6 ± 0.1	VC		209
		BH_3^+ Heat of formation 279 kcal mol^{-1}				
BH_3^+	BH_3		11.4 ± 0.2	SL	287*	2030
BH_3^+	B_2H_6	BH_3?	12.1 ± 0.2	SL	264*	102
BH_3^+	B_2H_6	BH_3?	13.1 ± 0.2	VC	287*	209
		BD_3^+				
BD_3^+	B_2D_6	BD_3?	12.7 ± 0.2	VC		209
		B_2H^+				
B_2H^+	B_2H_6	$2H_2+H$	21.4 ± 0.5	SL	450	102
B_2H^+	B_2H_6	$2H_2+H$	20.1 ± 0.1	VC	420	209
		B_2D^+				
B_2D^+	B_2D_6	$2D_2+D$	18.3 ± 0.1	VC		209
		$B_2H_2^+$ Heat of formation 329 kcal mol^{-1}				
$B_2H_2^+$	B_2H_6	$2H_2$	13.8 ± 0.2	SL	327*	102
$B_2H_2^+$	B_2H_6	$2H_2$	13.8 ± 0.1	VC	327*	209
$B_2H_2^+$	B_2H_6	$2H_2$	14.1 ± 0.2	VC	334*	1024
		B_2HD^+				
B_2HD^+	B_2D_5H?	$2D_2$	14.0 ± 0.1	VC		209
		$B_2D_2^+$				
$B_2D_2^+$	B_2D_6	$2D_2$	14.0 ± 0.1	VC		209

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_2H_3^+$ Heat of formation 285 kcal mol^{-1}				
$B_2H_3^+$	B_2H_6	H_2+H	14.8 ± 0.5	SL	298	102
$B_2H_3^+$	B_2H_6	H_2+H	14.2 ± 0.1	VC	284*	209
$B_2H_3^+$	B_2H_6	H_2+H	14.3 ± 0.2	VC	286*	1024
		$B_2HD_2^+$				
$B_2HD_2^+$	B_2D_5H?	D_2+D	14.2 ± 0.1	VC		209
		$B_2D_3^+$				
$B_2D_3^+$	B_2D_6	D_2+D	14.3 ± 0.1	VC		209
$B_2D_3^+$	B_2D_6	D_2+D	14.5 ± 0.2	VC		1024
		$B_2H_4^+$ Heat of formation 293 kcal mol^{-1}				
$B_2H_4^+$	B_2H_6	H_2	12.4 ± 0.3	SL	294*	102
$B_2H_4^+$	B_2H_6	H_2	12.3 ± 0.1	VC	292*	209
$B_2H_4^+$	B_2H_6	H_2	12.3 ± 0.2	VC	292*	1024
		$B_2HD_3^+$				
$B_2HD_3^+$	B_2D_5H?	D_2	12.3 ± 0.1	VC		209
		$B_2D_4^+$				
$B_2D_4^+$	B_2D_6	D_2	12.3 ± 0.1	VC		209
$B_2D_4^+$	B_2D_6	D_2	12.3 ± 0.2	VC		1024
		$B_2H_5^+$ Heat of formation 232 kcal mol^{-1}				
$B_2H_5^+$	B_2H_6	H	12.0 ± 0.3	SL	233*	102
$B_2H_5^+$	B_2H_6	H	11.9 ± 0.1	VC	231*	209
$B_2H_5^+$	B_2H_6	H	12.0 ± 0.1	VC	233*	1024
		$B_2HD_4^+$				
$B_2HD_4^+$	B_2D_5H?	D	12.0 ± 0.1	VC		209
		$B_2D_5^+$				
$B_2D_5^+$	B_2D_6	D	12.0 ± 0.1	VC		1024
$B_2D_5^+$	B_2D_6	D	12.1 ± 0.1	VC		209
		$B_2H_6^+$ Heat of formation 286 kcal mol^{-1}				
$B_2H_6^+$	B_2H_6		12.1 ± 0.2	SL	288*	102
$B_2H_6^+$	B_2H_6		11.9 ± 0.1	VC	283*	209
		$B_2D_6^+$				
$B_2D_6^+$	B_2D_6		12.0 ± 0.1	VC		209
		B_3H^+				
B_3H^+	B_4H_{10}		16.5 ± 0.8	VC		1119

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_3H_2^+$				
$B_3H_2^+$	B_4H_{10}		17.8 ± 0.8	VC		1119
		$B_3H_3^+$				
$B_3H_3^+$	B_4H_{10}		14.2 ± 0.3	VC		1119
		$B_3D_3^+$				
$B_3D_3^+$	B_4D_{10}		13.8 ± 0.3	VC		1119
		$B_3H_5^+$				
$B_3H_5^+$	B_4H_{10}		12.1 ± 0.2	VC		1119
		$B_3D_5^+$				
$B_3D_5^+$	B_4D_{10}		12.8 ± 0.3	VC		1119
		B_4H^+				
B_4H^+	B_5H_9		19.97 ± 1.0	SL		205
		$B_4H_2^+$				
$B_4H_2^+$	B_5H_9		17.99 ± 0.2	SL		205
$B_4H_2^+$	B_5H_9		17.59 ± 0.2	VDF		205
		$B_4H_3^+$				
$B_4H_3^+$	B_5H_9		15.96 ± 0.5	SL		205
$B_4H_3^+$	B_5H_9		15.52 ± 0.5	VDF		205
$B_4H_3^+$	B_4H_{10}		14.0 ± 0.4	VC		1119
		$B_4D_3^+$				
$B_4D_3^+$	B_4D_{10}		14.8 ± 0.4	VC		1119
		$B_4H_4^+$				
$B_4H_4^+$	B_5H_9		14.06 ± 0.1	SL		205
$B_4H_4^+$	B_4H_{10}		12.4 ± 0.2	VC		1119
		$B_4D_4^+$				
$B_4D_4^+$	B_4D_{10}		12.5 ± 0.2	VC		1119
$B_4D_4^+$	B_5D_9		13.7 ± 0.2	VC		1024
$B_4D_4^+$	B_5D_{11}		12.4 ± 0.5	VC		1024
		$B_4H_5^+$				
$B_4H_5^+$	B_4H_{10}		12.5 ± 0.3	VC		1119
$B_4H_5^+$	B_5H_9		15.07 ± 0.3	SL		205
$B_4H_5^+$	B_5H_9		14.50 ± 0.3	VDF		205

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_4D_5^+$				
$B_4D_5^+$	B_4D_{10}		12.5 ± 0.2	VC		1119
		$B_4H_6^+$ Heat of formation 275 kcal mol^{-1}				
$B_4H_6^+$	B_4H_{10}	$2H_2$	11.2 ± 0.1	VC	274*	1119
$B_4H_6^+$	B_5H_9	BH_3	12.25 ± 0.2	SL	276*	205
		$B_4D_6^+$				
$B_4D_6^+$	B_4D_{10}	$2D_2$	11.1 ± 0.1	VC		1119
$B_4D_6^+$	B_5D_9	BD_3	12.4 ± 0.2	VC		1024
$B_4D_6^+$	B_5D_{11}	$BD_3 + D_2$	11.4 ± 0.5	VC		1024
		$B_4H_7^+$				
$B_4H_7^+$	B_4H_{10}	$H_2 + H$	12.5 ± 0.2	VC	252	1119
		$B_4D_7^+$				
$B_4D_7^+$	B_4D_{10}	$D_2 + D$	12.2 ± 0.1	VC		1119
		$B_4H_8^+$				
$B_4H_8^+$	B_4H_{10}	H_2	10.4 ± 0.1	VC	256	1119
		$B_4D_8^+$				
$B_4D_8^+$	B_4D_{10}	D_2	9.9 ± 0.1	VC		1119
		$B_4H_9^+$				
$B_4H_9^+$	B_4H_{10}	H	12.2 ± 0.2	VC	245	1119
		$B_4D_9^+$				
$B_4D_9^+$	B_4D_{10}	D	11.9 ± 0.2	VC		1119
		$B_5H_4^+$				
$B_5H_4^+$	B_5H_9	$2H_2 + H$	13.01 ± 0.3	SL	265	205
$B_5H_4^+$	B_5H_9	$2H_2 + H$	13.20 ± 0.3	VDF	270	205
$B_5H_4^+$	B_5H_{11}		14.2 ± 0.4	VC		1024
		$B_5H_5^+$ Heat of formation 311 kcal mol^{-1}				
$B_5H_5^+$	B_5H_9	$2H_2$	12.67 ± 0.03	SL	310*	205
$B_5H_5^+$	B_5H_9	$2H_2$	12.8 ± 0.2	VC	313*	1024
$B_5H_5^+$	B_5H_{11}		12.7 ± 0.2	VC		1024
$B_5H_5^+$	B_6H_{10}		13.6 ± 0.2	VC		1024
		$B_5D_5^+$				
$B_5D_5^+$	B_5D_9	$2D_2$	12.92 ± 0.03	SL		205
$B_5D_5^+$	B_5D_9	$2D_2$	12.4 ± 0.4	VC		1024
$B_5D_5^+$	B_5D_{11}	$3D_2$	12.3 ± 0.2	VC		1024

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_5H_6^+$				
$B_5H_6^+$	B_5H_9	H_2+H	12.13 ± 0.3	SL	245	205
$B_5H_6^+$	B_5H_9	H_2+H	12.48 ± 0.3	VDF	253	205
$B_5H_6^+$	B_5H_{11}	$2H_2+H$?	12.6 ± 0.3	VC	263	1024
		$B_5D_6^+$				
$B_5D_6^+$	B_5D_9	D_2+D	12.4 ± 0.2	VC		1024
$B_5D_6^+$	B_5D_{11}	$2D_2+D$	12.2 ± 0.3	VC		1024
		$B_5H_7^+$ Heat of formation 283 kcal mol^{-1}				
$B_5H_7^+$	B_5H_9	H_2	11.43 ± 0.1	SL	281*	205
$B_5H_7^+$	B_5H_9	H_2	11.6 ± 0.2	VC	285*	1024
$B_5H_7^+$	B_5H_{11}	$2H_2$	11.5 ± 0.2	VC	290*	1024
$B_5H_7^+$	B_6H_{10}	BH_3	12.0 ± 0.2	VC	275*	1024
		$B_5D_7^+$				
$B_5D_7^+$	B_5D_9	D_2	10.93 ± 0.2	SL		205
$B_5D_7^+$	B_5D_9	D_2	11.2 ± 0.2	VC		1024
$B_5D_7^+$	B_5D_9	D_2	11.14 ± 0.2	VDF		205
$B_5D_7^+$	B_5D_{11}	$2D_2$	11.1 ± 0.2	VC		1024
		$B_5H_8^+$				
$B_5H_8^+$	B_5H_9	H	10.50 ± 0.1	SL	208	205
$B_5H_8^+$	B_5H_{11}		12.0 ± 0.3	VC		1024
$B_5H_8^+$	$B_{10}H_{16}$		11.6 ± 0.2	EVD		1102
$B_5H_8^+$	B_5H_8Br	Br	12.0 ± 0.2	VC		1102
$B_5H_8^+$	B_5H_8I	I	11.1 ± 0.1	EVD		1102
		$B_5D_8^+$				
$B_5D_8^+$	B_5D_{11}	D_2+D	11.4 ± 0.3	VC		1024
		$B_5H_9^+$ Heat of formation 262 kcal mol^{-1}				
$B_5H_9^+$	B_5H_9		10.38 ± 0.05	SL	257*	205
$B_5H_9^+$	B_5H_9		10.8 ± 0.5	SL	267*	103
$B_5H_9^+$	B_5H_9		10.5 ± 0.1	VC	260*	1024
$B_5H_9^+$	B_5H_{11}	H_2	10.3 ± 0.2	VC	262*	1024
		$B_5D_9^+$				
$B_5D_9^+$	B_5D_9		9.77 ± 0.1	SL		205
$B_5D_9^+$	B_5D_9		9.38 ± 0.15	SL		205
$B_5D_9^+$	B_5D_9		10.0 ± 0.1	VC		1024
$B_5D_9^+$	B_5D_{11}	D_2	10.4 ± 0.2	VC		1024
		$B_5H_{10}^+$				
$B_5H_{10}^+$	B_5H_{11}	H	11.8 ± 0.4	VC	245	1024

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_5D_{10}^+$				
$B_5D_{10}^+$	B_5D_{11}	D	11.3 ± 0.4	VC	232	1024
		$B_6H_4^+$				
$B_6H_4^+$	B_6H_{10}		13.4 ± 0.3	VC		1024
		$B_6H_5^+$				
$B_6H_5^+$	B_6H_{10}		12.0 ± 0.3	VC		1024
		$B_6H_6^+$				
$B_6H_6^+$	B_6H_{10}		11.9 ± 0.1	VC		1024
		$B_6H_7^+$				
$B_6H_7^+$	B_6H_{10}		11.5 ± 0.3	VC		1024
		$B_6H_8^+$				
$B_6H_8^+$	B_6H_{10}		11.2 ± 0.1	VC		1024
		$B_6H_9^+$				
$B_6H_9^+$	B_6H_{10}	H	11.1 ± 0.4	VC	227	1024
		$B_6H_{10}^+$ Heat of formation 237 kcal mol^{-1}				
$B_6H_{10}^+$	B_6H_{10}		9.3 ± 0.1	VC	237*	1024
		$B_6D_{10}^+$				
$B_6D_{10}^+$	B_6D_{10}		9.7 ± 0.2	VC		1024
		$B_{10}H_6^+$				
$B_{10}H_6^+$	$B_{10}H_{14}$	$4H_2$	13.56 ± 0.3	SL	320	189
$B_{10}H_6^+$	$B_{10}H_{14}$	$4H_2$	13.14 ± 0.3	VDF	311	189
		$B_{10}H_7^+$				
$B_{10}H_7^+$	$B_{10}H_{14}$	$3H_2 + H$	12.51 ± 0.5	VDF	244	189
		$B_{10}H_8^+$				
$B_{10}H_8^+$	$B_{10}H_{14}$	$3H_2$	12.66 ± 0.3	SL	299	189
$B_{10}H_8^+$	$B_{10}H_{14}$	$3H_2$	12.67 ± 0.3	VDF	300	189
		$B_{10}H_{10}^+$				
$B_{10}H_{10}^+$	$B_{10}H_{14}$	$2H_2$	11.62 ± 0.2	SL	276	189
		$B_{10}H_{11}^+$				
$B_{10}H_{11}^+$	$B_{10}H_{14}$	$H_2 + H$	10.81 ± 0.5	VDF	205	189

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$B_{10}H_{12}^+$				
$B_{10}H_{12}^+$	$B_{10}H_{14}$	H_2	10.90 ± 0.2	SL	259	189
$B_{10}H_{12}^+$	$B_{10}H_{14}$	H_2	10.87 ± 0.2	VDF	258	189
		$B_{10}H_{14}^+$				
$B_{10}H_{14}^+$	$B_{10}H_{14}$		11.0 ± 0.5	SL	261	103
$B_{10}H_{14}^+$	$B_{10}H_{14}$		10.26 ± 0.5	VDF	244	189
		$B_{10}H_{16}^+$				
$B_{10}H_{16}^+$	$B_{10}H_{16}$		10.1 ± 0.2	EVD		1102
		C^+ Heat of formation 431 kcal mol^{-1}				
C^+	C		11.267	S	431*	2113
C^+	C		11.3 ± 0.2	NS	432	333, 1155
C^+	CH_3CN		27.0 ± 0.3	NS		131
C^+	CO	O^-	20.89 ± 0.09	RPD	431	2180
C^+	CO	O^-	20.89 ± 0.09	RPD	431	2191
C^+	CO	O^-	21.0 ± 0.1	FDP	434	2014
C^+	CO	O^-	20.5 ± 0.7	NS	422	2016
C^+	CO	O^-	20.902 ± 0.02	D	431	6
C^+	CO	O	22.57 ± 0.20	RPD	435	2180
C^+	CO	O	22.57 ± 0.20	RPD	435	2191
C^+	CO	O	22.4 ± 0.1	FDP	431	2014
C^+	CO	O	22.6 ± 0.6	NS	435	2016
C^+	CH_3NO_2		22.83 ± 0.05	VC		90
C^+	CF_4		31.5 ± 0.5	SL		24
C^+	CH_3Cl		26.25 ± 0.1	NS		131
C^+	CH_2Cl_2		25.45 ± 0.1	NS		131
C^+	$CHCl_3$		24.62 ± 0.05	NS		131
C^+	CF_3Cl		31 ± 1	SL		24
C^+	CBr_4	4Br?	23.1 ± 0.4	EVD	445	1246
C^+	CBr_4	4Br?	25.3 ± 0.5	EVD		1246
C^+	CBr_4	4Br?	27.1 ± 0.5	EVD		1246
C^+	CH_2Br_2		24.52 ± 0.05	NS		131
C^+	$CHBr_3$		23.55 ± 0.05	NS		131
C^+	CF_3Br		33 ± 1	SL		24
C^+	CF_3I		32.6 ± 1	SL		24
C^+	CO	O^-	20.8 ± 0.5	PI	429	163
C^+	CO	O	22.3 ± 0.4	PI	428	163
C^+	CO	O	24.8 ± 0.5	PI		163
C^+	CO	O	26.4 ± 0.3	PI		163
		C_2^+ Heat of formation 475 kcal mol^{-1}				
C_2^+	C_2		13	VC	499	2102
C_2^+	C_2		12.0 ± 0.6	NS	476*	333, 1155
C_2^+	C_2H_2	H_2	18.2	VC	474*	2102
C_2^+	C_2H_2	2H	22.7	VC	474*	2102
C_2^+	C_2H_2	2H	23.3 ± 0.5	VC	487	13
C_2^+	C_2N_2	N_2	18.4 ± 0.3	SL	498	154
C_2^+	CNC≡CCN	C_2N_2	18.5 ± 0.3	SL	481	154
C_2^+	CNC≡CC≡CCN	C_4N_2	18.4 ± 1.0	SL	479	154
C_2^+	CH≡CCN	HCN	18.6 ± 0.2	SL	488	154

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
C_3^+ Heat of formation 480 kcal mol^{-1}						
C_3^+	C_3		14.4 ± 0.3	SL	521	154
C_3^+	C_3		13.6	SL	503	154
C_3^+	C_3		14.0	SL	513	154
C_3^+	C_3		12.6 ± 0.6	NS	480*	333, 1155
C_3^+	$CH_3C{\equiv}CH$	H_2+2H?	26.0 ± 1	VC	540	13
C_3^+	$CNC{\equiv}CCN$	CN+N?	24.6 ± 0.5	SL	482	154
C_3^+	$CNC{\equiv}CC{\equiv}CCN$	C_3N+N?	23.0 ± 2.0	SL	474	154
C_3^+	$CH{\equiv}CCN$	N+H?	24.5 ± 0.5	SL	491	154
C_4^+						
C_4^+	C_4		12.6	NS	533	333, 1155
C_4^+	$CNC{\equiv}CCN$	N_2	17.2 + 0.2	SL	525	154
C_4^+	$CNC{\equiv}CC{\equiv}CCN$	C_2N_2	17.8 ± 0.4	SL	520	154
C_5^+						
C_5^+	C_5		12.7 + 0.5	SL	535	154
C_5^+	C_5		12.5 ± 1	NS	531	333, 1155
C_5^+	$CNC{\equiv}CC{\equiv}CCN$	CN + N	24.0 ± 0.5	SL	523	154
C_6^+						
C_6^+	C_6		12.5 ± 0.3	SL		154
CH^+ Heat of formation 399 kcal mol^{-1}						
CH^+	CH		11.13 ± 0.22	S	399*	2114
CH^+	CH_3	H_2	15.58 ± 0.30	LE	393	414
CH^+	C_2H_2	CH	21.68	VC	412	2102
CH^+	C_3H_8		26.0 ± 1	VC		1408
CH^+	C_3H_8		31.8 ± 1.5	VC		1408
CH^+	CH_3CN	HCN + H?	22.4 ± 0.2	NS	453	131
CH^+	$CH{\equiv}CCN$	C_2N?	21.9 ± 0.3	SL	485	154
CH^+	CH_3OH	H_2O + H?	22.31 ± 0.09	NS	472	131
CH^+ (Ethylene oxide)	C_2H_4O		22.8 ± 0.4	EVD		50
CH^+	CH_3Cl	H_2 + Cl?	22.5 ± 0.06	NS	470	131
CH^+	CH_2Cl_2	Cl + HCl?	21.72 ± 0.04	NS	472	131
CH^+	$CHCl_3$	3Cl?	23.9 ± 0.3	EVD	438	43
CH^+	$CHCl_3$	3Cl?	22.90 ± 0.04	NS	416	131
CH^+	CH_3Br	H_2 + Br?	21.41 ± 0.05	NS	459	131
CH^+	CH_2Br_2	H + 2Br?	21.55 ± 0.05	NS	390	131
CH^+	$CHBr_3$	3Br?	21.70 ± 0.05	NS	424	131
CH^+	CH_3I	H_2 + I?	21.2 ± 0.2	NS	466	131

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_2^+ Heat of formation 333 kcal mol^{-1}						
CH_2^+	CH_2		10.396 ± 0.003	S	(a)	1078
CH_2^+	CH_2		11.82 ± 0.05	VC	(a)	327
CH_2^+	CH_2		10.7 ± 0.5	NS	(a)	87
(EI on neutral fragment from C_3H_8)						
CH_2^+	CH_2		11.0 ± 0.5	NS	(a)	87
(EI on neutral fragment from n-C_4H_{10})						
CH_2^+	CH_3	H	15.29 ± 0.08	VC	334*	414
CH_2^+	CH_3	H	15.41 ± 0.15	LE	337	414
CH_2^+	CH_4	H_2	15.16 ± 0.04	PI	332*	1128
CH_2^+	CH_4	H_2	15.6 ± 0.2	RPD	342	160
CH_2^+	CH_4	H_2	16.3 ± 0.2	RPD		160
CH_2^+	CH_4	H_2	16.8 ± 0.2	RPD		160
CH_2^+	CH_4	H_2	17.7 ± 0.2	RPD		160
CH_2^+	CH_4	H + H$^-$?	19.4	RPD	344	160
CH_2^+	CH_4	2H	20.0	RPD	339	160
CH_2^+	C_2H_2		21	VC		2136
CH_2^+	C_2H_4	CH_2	19.0	VC	357	419
CH_2^+	CH_2N_2	N_2	12.3 ± 0.1	VC	(a)	314
(Diazomethane)						
CH_2^+	CH_2N_2	N_2	11.0 ± 0.1	VC	(a)	314
(Diazirine)						
CH_2^+	C_2H_4O	CHO + H?	16.5 ± 0.4	EVD	320	50
(Ethylene oxide)						
CH_2^+	C_3H_6O	C_2H_3O + H	18.8 ± 0.5	EVD	364	50
(Propylene oxide)						
CH_2^+	$C_4H_8O_2$		21.3 ± 0.5	EVD		153
(1,2-Epoxy-3-methoxypropane)						
CH_2^+	CH_2=CF_2	CF_2	17.8	VC	367	419
CH_2^+	CH_3CF_3	HCF_3	16.2 ± 0.3	SL	362	1075
CH_2^+	CH_3BF_2	HBF_2	16.9 ± 0.1	VC	(b)	1076
CH_2^+	C_2H_4S	CS + 2H	20.4 ± 0.5	EVD	(b)	51
(Ethylene sulfide)						
CH_2^+	CH_3Cl	HCl	14.6 ± 0.2	RPD	339	160
CH_2^+	CH_3Cl	HCl	15.3 ± 0.2	RPD		160
CH_2^+	CH_3Cl	HCl	15.9 ± 0.2	RPD		160
CH_2^+	CH_3Cl	HCl	16.8 ± 0.2	RPD		160
CH_2^+	CH_3Cl	H + Cl$^-$?	15.3 ± 0.2	RPD	340	160
CH_2^+	CH_3Cl	Cl + H$^-$?	18.4 ± 0.2	RPD	343	160
CH_2^+	CH_3Cl	H$^+$Cl	19.1 ± 0.2	RPD	340	160
CH_2^+	C_3H_5OCl		21.6 ± 0.5	EVD		153
(Epichlorohydrin)						
CH_2^+	CH_3Br	HBr	14.9 ± 0.2	RPD	344	160
CH_2^+	CH_3Br	HBr	15.6 ± 0.2	RPD		160
CH_2^+	CH_3Br	HBr	16.1 ± 0.2	RPD		160
CH_2^+	CH_3Br	HBr	17.0 ± 0.2	RPD		160
CH_2^+	CH_3Br	H + Br$^-$?	15.15 ± 0.2	RPD	345	160
CH_2^+	CH_3Br	Br + H$^-$?	18.1 ± 0.2	RPD	349	160
CH_2^+	CH_3Br	H + Br	18.7	RPD	344	160
CH_2^+	C_3H_5OBr		21.4 ± 0.5	EVD		153
(Epibromohydrin)						

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_2^+	CH_3I	HI	14.6 ± 0.2	RPD	333	160
CH_2^+	CH_3I	HI	15.3 ± 0.2	RPD		160
CH_2^+	CH_3I	HI	15.9 ± 0.2	RPD		160
CH_2^+	CH_3I	HI	16.7 ± 0.2	RPD		160
CH_2^+	CH_3I	H + I^-?	14.6 ± 0.2	RPD	335	160
CH_2^+	CH_3I	I + H^-?	17.0 ± 0.2	RPD	336	160
CH_2^+	CH_3I	I + H^-?	18.1	RPD		160
CH_2^+	CH_3I	H + I	17.7 ± 0.2	RPD	334	160
		CD_2^+				
CD_2^+	CD_4	D_2	15.25 ± 0.04	PI		1128
		CH_3^+ Heat of formation 260 kcal mol^{-1}				
CH_3^+	CH_3		9.840 ± 0.002	S	260*	349
CH_3^+	CH_3		9.82 ± 0.04	PI	260*	1068
CH_3^+	CH_3		9.80 ± 0.1	RPD	259	2158
CH_3^+	CH_3		10.3 ± 0.1	RPD		2158
CH_3^+	CH_3		10.7 ± 0.1	RPD		2158
CH_3^+	CH_3		11.4 ± 0.1	RPD		2158
CH_3^+	CH_3		9.86 ± 0.02	VC	261	327
CH_3^+	CH_3		10.11 ± 0.10	VC	266	414
CH_3^+	CH_3		10.04 ± 0.12	LE	265	414
CH_3^+	CH_3		9.8 ± 0.1	NS	259	87, 1129
(EI on neutral fragment from C_3H_8)						
CH_3^+	CH_3		9.8 ± 0.1	NS	259	87
(EI on neutral fragment from benzene)						
CH_3^+	CH_3		10.0 ± 0.1	NS	264	87
(EI on neutral fragment from n-C_4H_{10})						
CH_3^+	CH_3		10.0 ± 0.2	NS	264	87
(EI on neutral fragment from n-C_6H_{14})						
CH_3^+	CH_3		10.0 ± 0.3	NS	264	464
CH_3^+	CH_4	H	14.25 ± 0.02	PI	259*	1128
CH_3^+	CH_4	H	14.23 ± 0.05	PI	258*	2013
CH_3^+	CH_4	H	14.3 ± 0.05	RPD	260	224
CH_3^+	CH_4	H	14.75 ± 0.1	RPD		224
CH_3^+	CH_4	H	15.3 ± 0.1	RPD		224
CH_3^+	CH_4	H	14.3 ± 0.05	RPD	260	2154
CH_3^+	CH_4	H	14.28 ± 0.08	RPD	259	1072
CH_3^+	CH_4	H	20.85 ± 0.27	RPD		1072
CH_3^+	CH_4	H	14.3 ± 0.1	MSD	260	1451
CH_3^+	CH_4	H^-?	13.7 ± 0.05	RPD	265	2154
HC_3^+	CH_4	H^-?	14.7 ± 0.05	RPD		2154
CH_3^+	CH_4	H^-?	15.4 ± 0.05	RPD		2154
CH_3^+	CH_4	H^-?	16.4 ± 0.05	RPD		2154
CH_3^+	C_2H_6	CH_3	13.6	RPD	260	160
CH_3^+	C_2H_6	CH_3^-?	12.6	RPD		160
CH_3^+	C_2H_6	CH_3^-?	13.6	RPD		160
CH_3^+	C_2H_6	CH_3^-?	14.3	RPD		160
CH_3^+	C_2H_6	CH_3^-?	15.3	RPD		160
CH_3^+	C_2H_6	CH_3^-?	16.0	RPD		160
CH_3^+	$CH_3C{\equiv}CH$	C_2H	15.4 ± 0.5	VC	(b)	13

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_3^+	C_3H_8	C_2H_5	15.2 ± 1	VC	301	1408
CH_3^+	C_3H_8	C_2H_5	20.2 ± 0.5	VC		1408
CH_3^+	C_3H_8	C_2H_5	14.0 ± 0.5	LE	273	2021
CH_3^+	C_3H_8	C_2H_5	17.5 ± 0.5	LE		2021
CH_3^+	C_3H_8	C_2H_5	20.0 ± 0.5	LE		2021
CH_3^+	C_3H_8	$C_2H_5^+$	22.0 ± 0.5	VC	263	1408
CH_3^+	C_3H_8	$C_2H_5^+$	22.4 ± 0.5	LE	273	2021
CH_3^+	C_3H_8	$H_2 + C_2H_3^+$	25.0 ± 0.5	VC	269	1408
CH_3^+	$CH_3CH{=}C{=}CH_2$	C_3H_3	14.4 ± 0.2	SL	(b)	462
CH_3^+	$CH_3C{\equiv}CCH_3$	C_3H_3	17.6 ± 0.5	VC	(b)	13
CH_3^+	*neo*-C_5H_{12}	*tert*-C_4H_9	13.14	VC	259	2101
CH_3^+	*neo*-C_5H_{12}		20.07	VC		2101
CH_3^+	$C_2H_5C{\equiv}CC{\equiv}CH$		18.50	EVD		1197
CH_3^+	$CH_3C{\equiv}CC{\equiv}CCH_3$		25.70	EVD		1197
CH_3^+	$(CH_3)_3B$	$(CH_3)_2B$	15.1 ± 0.3	SL	(b)	364
CH_3^+ (Ethylenimine)	C_2H_5N	$HCN + H$	15.5 ± 0.3	EVD	299	51
CH_3^+ (Azetidine)	$(CH_2)_3NH$	$C_2H_3N + H$	14.4 ± 1.0	EVD	275	52
CH_3^+	$CH_3N_2H_3$	N_2H_3	14.1 ± 0.3	SL	(b)	424
CH_3^+	$CH_3N{=}NCH_3$	$CH_3^+N_2$	11.5 ± 0.1	SL	275	304
CH_3^+ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3NNH_2	14.5 ± 0.3	SL	(b)	424
CH_3^+ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3NHNH	13.9 ± 0.3	SL	(b)	424
CH_3^+	$(CH_3)_3N_2H$	$(CH_3)_2N_2H$	14.0 ± 0.5	SL	(b)	424
CH_3^+	$(CH_3)_4N_2$	$(CH_3)_3N_2$	14 ± 1	SL	(b)	424
CH_3^+	CH_3N_3	$N_2 + N?$	14.1 ± 0.1	SL	269	340
CH_3^+	CH_3OH	OH	13.7	RPD	259	2018
CH_3^+	CH_3OH	OH	14.7	RPD		2018
CH_3^+	CH_3OH	OH	15.3	RPD		2018
CH_3^+	CH_3OH	OH	13.5	NS	254	46
CH_3^+	CH_3OH	$OH^-?$	11.9	RPD		2018
CH_3^+	CH_3OH	$OH^-?$	13.0	RPD		2018
CH_3^+	CH_3OH	$OH^-?$	13.7	RPD		2018
CH_3^+	CH_3OH	$OH^-?$	14.7	RPD		2018
CH_3^+	CH_3OH	$OH^-?$	15.3	RPD		2018
CH_3^+	CH_3CHO	CHO	13.12 ± 0.06	EVD	267	127
CH_3^+	CH_3CHO	$CO + H$	14.55	SL	270	298
CH_3^+ (Ethylene oxide)	C_2H_4O	$CO + H$	14.3 ± 0.2	EVD	292	50
CH_3^+	$(CH_3)_2O$	CH_3O	13.1	RPD	(b)	2018
CH_3^+	$(CH_3)_2O$	$CH_3O^-?$	10.5	RPD		2018
CH_3^+	$(CH_3)_2O$	$CH_3O^-?$	11.6	RPD		2018
CH_3^+	$(CH_3)_2CO$	$CO + CH_3?$	15.20	SL	292	298
CH_3^+	$(CH_3)_2CO$	CH_3CO	13.15 ± 0.17	VC	256	2174
CH_3^+ (Propylene oxide)	C_3H_6O	$CH_3CO?$	13.9 ± 0.2	EVD	303	50
CH_3^+	$CH_3COC_2H_5$	$CO + C_2H_5$	15.20	SL	294	298
CH_3^+	CH_3COOH	COOH	16.08	LE	306	171
CH_3^+ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		16.0 ± 0.3	EVD		153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_3^+	$(CH_3O)_2BH$		13.4 ± 0.5	SL		364
CH_3^+	$(CH_3O)_3B$		21.4 ± 0.5	EVD		115
CH_3^+	$(CH_3O)_3B$		13.6 ± 0.5	SL		364
CH_3^+	CH_3COCHN_2	$COCHN_2$	13.2 ± 0.06	LE		2174
CH_3^+	CH_3NO_2	NO_2	12.6	RPD	265	2018
CH_3^+	CH_3NO_2	NO_2^-?	8.7	RPD		2018
CH_3^+	CH_3NO_2	NO_2^-?	9.8	RPD		2018
CH_3^+	CH_3NO_2	NO_2^-?	10.4	RPD		2018
CH_3^+	CH_3NO_2	NO_2^-?	11.5	RPD		2018
CH_3^+	CH_3NO_2	NO_2^-?	12.1	RPD		2018
CH_3^+	$C_2H_5ONO_2$	CH_2ONO_2	13.75 ± 0.50	VC	(b)	1013
CH_3^+	CH_3F	F	14.5 ± 0.05	RPD	249	2154
CH_3^+	CH_3F	F	14.7 ± 0.3	SL	253	1136
CH_3^+	CH_3F	F	16.3 ± 0.3	SL		1136
CH_3^+	CH_3F	F	16.5 ± 0.5	SL		1136
CH_3^+	CH_3F	F^-?	10.8 ± 0.05	RPD	247	2154
CH_3^+	CH_3F	F^-?	11.9 ± 0.05	RPD		2154
CH_3^+	CH_3F	F^-?	12.6 ± 0.05	RPD		2154
CH_3^+	CH_3F	F^-?	13.4 ± 0.05	RPD		2154
CH_3^+	CH_3F	F^-	12.7 ± 0.5	SL	291	1136
CH_3^+	CH_3CHF_2	CHF_2	18.6	VC	(b)	1288
CH_3^+	CH_3CF_3	CF_3	15.0 ± 0.1	SL	284	1075
CH_3^+	CH_3BF_2	BF_2	14.8 ± 0.1	VC	278	1076
CH_3^+	CH_3COCF_3	$CO + CF_3$	14.60	SL	(a)	298
CH_3^+	CH_3SiH_3	SiH_3	15.1 ± 0.3	SL		2182
CH_3^+	$(CH_3)_3SiH$	$(CH_3)_2SiH$	14.8 ± 0.5	EVD	(b)	83
CH_3^+	CH_3PH_2	PH_2	14.8 ± 0.2	EVD	304	2045
CH_3^+	$(CH_3)_3P$	$(CH_3)_2P^+$	21.7 ± 0.5	VC	263	1036
CH_3^+	$(CH_3)_2S$	$CH_2 + SH$	17.0 ± 0.4	EVD		84
CH_3^+	$(CH_3)_2S$	CH_3S	13.0	SL	(b)	307
CH_3^+	CH_3SCD_3	CD_3S	13.1	SL		307
CH_3^+ (Propylene sulfide)	C_3H_6S		18.1 ± 0.4	EVD		188
CH_3^+	$C_2H_5SCH_3$		17.6 ± 0.5	EVD		176
CH_3^+	$CH_3SCH_2CH=CH_2$		17.7 ± 0.5	EVD		186
CH_3^+	*n*-$C_3H_7SCH_3$		16.6 ± 0.5	EVD		176
CH_3^+	*iso*-$C_3H_7SCH_3$		19.4 ± 0.5	EVD		186
CH_3^+	CH_3SSCH_3		15.7 ± 0.3	EVD		176
CH_3^+	CH_3NCS	NCS	15.3 ± 0.3	EVD	(b)	315
CH_3^+	C_2H_5NCS		19.6 ± 0.5	EVD		315
CH_3^+	CH_3Cl	Cl	13.6 ± 0.05	RPD	265	2154
CH_3^+	CH_3Cl	Cl	13.4 ± 0.1	SL	261	364
CH_3^+	CH_3Cl	Cl	13.6 ± 0.1	SL	265	364
CH_3^+	CH_3Cl	Cl	13.7 ± 0.2	SL	267	1136

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_3^+	CH_3Cl	Cl^-	10.07	PI	272	1399
CH_3^+	CH_3Cl	Cl^-?	9.8±0.05	RPD	265	2154
CH_3^+	CH_3Cl	Cl^-?	10.8±0.05	RPD		2154
CH_3^+	CH_3Cl	Cl^-?	11.5±0.05	RPD		2154
CH_3^+	CH_3Cl	Cl^-?	12.4±0.05	RPD		2154
CH_3^+	CH_3Cl	Cl^-?	13.2±0.05	RPD		2154
CH_3^+	CH_3Cl	Cl^-	10.2±0.5	SL	275	1136
CH_3^+	CH_3Cl	Cl^-	11.1±0.1	FDP	295	1378
CH_3^+	C_2H_5Cl	CH_2Cl?	15.9±0.3	VC	(b)	356
CH_3^+	CH_3COCH_2Cl	$CO+CH_2Cl$	13.9±0.2	VC	(b)	2174
CH_3^+ (Epichlorohydrin)	C_3H_5OCl	$CO+CH_2Cl$?	14.6±0.5	EVD	(b)	153
CH_3^+	CH_3SiCl_3	$SiCl_3$	15.0±0.2	SL	(b)	2182
CH_3^+	$(CH_3)_4Ge$	$Ge+3CH_3$	20.1±0.5	EVD	239	83
CH_3^+	CH_3Br	Br	13.0±0.05	RPD	265	2154
CH_3^+	CH_3Br	Br	12.9±0.1	SL	262	1136
CH_3^+	CH_3Br	Br^-?	10.7±0.05	RPD		2154
CH_3^+	CH_3Br	Br^-?	11.4±0.05	RPD		2154
CH_3^+	CH_3Br	Br^-?	12.3±0.05	RPD		2154
CH_3^+	CH_3Br	Br^-?	13.0±0.05	RPD		2154
CH_3^+	C_2H_5Br	CH_2Br	16.9±0.3	VC	(b)	356
CH_3^+ (Epibromohydrin)	C_3H_5OBr	$CO+CH_2Br$?	15.6±0.5	EVD	(b)	153
CH_3^+	CH_3I	$I(^2P_{3/2})$	12.2±0.05	RPD	259	2154
CH_3^+	CH_3I	$I(^2P_{1/2})$	13.1±0.05	RPD	258	2154
CH_3^+	CH_3I	I	12.4±0.2	SL	264	1136
CH_3^+	CH_3I	I^-?	9.1±0.05	RPD	260	2154
CH_3^+	CH_3I	I^-?	10.1±0.05	RPD		2154
CH_3^+	CH_3I	I^-?	10.8±0.05	RPD		2154
CH_3^+	CH_3I	I^-?	11.8±0.05	RPD		2154
CH_3^+	CH_3I	I^-?	12.6±0.05	RPD		2154
CH_3^+	C_2H_5I	CH_2I	16.3±0.3	VC	(b)	356
CH_3^+	$(CH_3)_2Hg$	CH_3Hg	13.4±0.1	SL	(b)	306
CH_3^+	CH_3HgCl	HgCl	14.8±0.2	SL	(b)	306
CH_3^+ High kinetic energy ions						
CH_3^+	C_2H_6		30.3±0.2	NRE		1264
CH_3^+	C_3H_8	$C_2H_5^+$	27.8±0.2	NRE		1451
CH_3^+	C_3H_8		30.8±0.2	NRE		1264
CH_3^+	C_3H_8	$C_2H_5^+$	34.5±0.5	NRE		1451
CH_3^+	n-C_4H_{10}		29.7±0.2	NRE		1264
CH_3^+	iso-C_4H_{10}		29.4±0.2	NRE		1264
CH_3^+	neo-C_5H_{12}		29.5±0.2	NRE		1264
CH_3^+ (Benzene)	C_6H_6		28.2±0.2	NRE		1264
CH_3^+	n-C_7H_{16}		27.9±0.2	NRE		1264
CH_3^+	iso-C_3H_7OH		30.2±0.2	NRE		1264
CH_3^+	iso-C_3H_7Cl		29.7±0.2	NRE		1264

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CD_3^+				
CD_3^+	CD_3		9.832 ± 0.002	S		349
CD_3^+	CD_4	D	14.38 ± 0.03	PI		1128
CD_3^+	CD_3COOH	COOH	15.56	LE		171
		CH_4^+ Heat of formation 274 kcal mol^{-1}				
CH_4^+	CH_4		12.704 ± 0.008	PI	275*	1253
CH_4^+	CH_4		12.99 ± 0.01	PI	282	416
CH_4^+	CH_4		12.71 ± 0.02	PI	275*	1128
CH_4^+	CH_4		12.98 ± 0.02	PI	282	182
CH_4^+	CH_4		12.55 ± 0.05	PI	272*	2013
CH_4^+	CH_4		13.1 ± 0.1	PI	284	331
CH_4^+	CH_4		12.8 ± 0.2	PI	278	230
CH_4^+	CH_4		12.9 ± 0.4	S	280	138
CH_4^+	CH_4		12.99	PE	282	1130
CH_4^+	CH_4		13.00 ± 0.02	RPD	282	224
CH_4^+	CH_4		13.6 ± 0.1	RPD		224
CH_4^+	CH_4		14.2 ± 0.1	RPD		224
CH_4^+	CH_4		14.7 ± 0.1	RPD		224
CH_4^+	CH_4		13.16 ± 0.02	RPD	286	289
CH_4^+	CH_4		13.18 ± 0.02	RPD	286	1072
CH_4^+	CH_4		13.1	VC	284	2136
CH_4^+	CH_4		13.21 ± 0.1	NS	287	1129
(EI on neutral fragment from C_3H_8)						
CH_4^+	CH_4		13.04	TC	283	1352, 2020
CH_4^+	CH_4		13.25	TC	288	136
CH_4^+	CH_4		14.06	TC	306	1006
CH_4^+	CH_4		19.42 ± 0.08	RPD	430	289
CH_4^+	CH_4		19.35 ± 0.40	RPD	428	1072
CH_4^+	CH_4		19.30	TC	427	1352, 2020
CH_4^+	C_2H_4O	CO	12.3 ± 0.2	EVD	297	50
(Ethylene oxide)						
		CD_4^+				
CD_4^+	CD_4		12.882 ± 0.008	PI		1253
CD_4^+	CD_4		12.87 ± 0.02	PI		1128
CD_4^+	CD_4		13.1	VC		2136
		C_2H^+ Heat of formation 399 kcal mol^{-1}				
C_2H^+	C_2H_2	H	17.22	PI	399*	1400
C_2H^+	C_2H_2	H	17.3	VC	401	2102
C_2H^+	C_2H_2	H	17.3	VC	401	2136
C_2H^+	C_2H_2	H	17.8 ± 0.5	VC	413	13
C_2H^+	C_2H_2	H	17.4	MSD	403	1451
C_2H^+	C_2H_2	H	17.56 ± 0.1	NS	407	1129
(EI on neutral fragment from C_3H_8)						

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
C_2H^+	$CH_3C{\equiv}CH$	CH_3	17.2 ± 0.5	VC	408	13
C_2H^+	C_3H_8	$2H_2 + CH_3^+$	30.4 ± 0.5	VC	417	1408
C_2H^+	$CH{\equiv}CC{\equiv}CH$	C_2H	20.1 ± 0.5	VC	454	13
C_2H^+	$CH{\equiv}CCN$	CN	19.0 ± 0.2	SL	429	154
C_2H^+ (Ethylene oxide)	C_2H_4O	$2H + OH$	24.0 ± 0.3	EVD	427	50
C_2H^+	$CH_3COC{\equiv}CH$	$CH_3 + CO$?	17.95	SL	418	298
C_2H^+	$C_2H_5SSC_2H_5$		11.35	SL		307
		C_2D^+				
C_2D^+	C_2D_2	D	17.34	PI		1400
		$C_2H_2^+$ Heat of formation 317 kcal mol^{-1}				
$C_2H_2^+$	C_2H_2		11.396 ± 0.003	PI	317*	1253
$C_2H_2^+$	C_2H_2		11.400 ± 0.005	PI	317*	2013
$C_2H_2^+$	C_2H_2		11.406 ± 0.006	PI	317*	54, 1019, 1118,1400
$C_2H_2^+$	C_2H_2		11.41 ± 0.01	PI	317*	182, 162, 416, 1022
$C_2H_2^+$	C_2H_2		11.25 ± 0.05	PI	314	156
$C_2H_2^+$	C_2H_2		11.36	PE	316	1108
$C_2H_2^+$ ($^4\Pi_u$)	C_2H_2		16.27	PE	429	1108
$C_2H_2^+$ ($^4\Sigma_g^-$)	C_2H_2		18.33	PE	477	1108
$C_2H_2^+$	C_2H_2		11.41	PE	317*	1130
$C_2H_2^+$	C_2H_2		16.41	PE		1130
$C_2H_2^+$	C_2H_2		18.56	PE		1130
$C_2H_2^+$	C_2H_2		20.51	PE		1130
$C_2H_2^+$	C_2H_2		11.40 ± 0.02	RPD	317	224
$C_2H_2^+$	C_2H_2		11.7 ± 0.1	RPD		224
$C_2H_2^+$	C_2H_2		12.1 ± 0.1	RPD		224
$C_2H_2^+$	C_2H_2		13.2 ± 0.1	RPD		224
$C_2H_2^+$	C_2H_2		14.5 ± 0.1	RPD		224
$C_2H_2^+$	C_2H_2		17.0 ± 0.1	RPD		224
$C_2H_2^+$	C_2H_2		11.50 ± 0.10	RPD	319	166
$C_2H_2^+$	C_2H_2		13.25 ± 0.19	RPD		166
$C_2H_2^+$	C_2H_2		16.95 ± 0.30	RPD		166
$C_2H_2^+$	C_2H_2		11.41 ± 0.01	VC	317	13
$C_2H_2^+$	C_2H_2		11.36	TC	316	136
$C_2H_2^+$	C_2H_4	H_2	12.96 ± 0.02	PI	311	2013
$C_2H_2^+$	C_2H_4	H_2	13.40 ± 0.08	RPD	321	166
$C_2H_2^+$	C_2H_4	H_2	15.00 ± 0.08	RPD		166
$C_2H_2^+$	C_2H_4	H_2	13.2 ± 0.1	VC	317	419
$C_2H_2^+$	C_2H_4	2H	17.55 ± 0.20	RPD	313	166
$C_2H_2^+$	C_2H_4	2H	21.41 ± 0.31	RPD		166
$C_2H_2^+$	C_2H_4	2H	25.20 ± 1.0	RPD		166
$C_2H_2^+$	C_3H_8	$CH_4 + H_2$	14.1 ± 0.15	VC	318	1408
$C_2H_2^+$	C_3H_8		21.8 ± 1	VC		1408
$C_2H_2^+$	C_3H_8	$H_2 + H + CH_3^+$	28.5 ± 1	VC	321	1408
$C_2H_2^+$ (Benzene)	C_6H_6	$2C_2H_2$	18.6 ± 0.3	EVD	340	1238
$C_2H_2^+$ (Benzene-excess KE ion)	C_6H_6		32.6 ± 0.2	SRP		1264

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_2^+$	C_2H_5N	$NH + H_2$	16.4 ± 0.4	EVD	325	51
(Ethlyenimine)						
$C_2H_2^+$	C_2H_3CN	HCN	13.13 ± 0.10	EVD	315	1406
$C_2H_2^+$	$(CH_2)_3NH$	$CH_3 + NH_2$	16.6 ± 0.5	EVD	324	52
(Azetidine)						
$C_2H_2^+$	$(CH_2)_4NH$	$C_2H_5 + NH_2$?	17.3 ± 1.0	EVD	331	52
(Pyrrolidine)						
$C_2H_2^+$	$C_4H_4N_2$		14.94 ± 0.10	EVD		1406
(Orthodiazine)						
$C_2H_2^+$	$C_4H_4N_2$		15.79 ± 0.05	EVD		1406
(Metadiazine)						
$C_2H_2^+$	$C_4H_4N_2$		15.23 ± 0.10	EVD		1406
(Paradiazine)						
$C_2H_2^+$	C_2H_4O	H_2O?	15.7 ± 0.3	EVD	407	50
(Ethylene oxide)						
$C_2H_2^+$	C_3H_6O	$CH_2O + H_2$	13.9 ± 0.2	EVD	327	50
(Propylene oxide)						
$C_2H_2^+$	$(CH_2)_3O$	$CO + 2H_2$	15.2 ± 0.2	EVD	353	52
(Trimethylene oxide)						
$C_2H_2^+$	C_4H_6O		13.8 ± 0.3	EVD		153
(3,4-Epoxy-1-butene)						
$C_2H_2^+$	$(CH_2)_4O$		17.3 ± 0.3	EVD		52
(Tetrahydrofuran)						
$C_2H_2^+$	$C_4H_8O_2$		16.2 ± 0.3	EVD		153
(1,2-Epoxy-3-methoxypropane)						
$C_2H_2^+$	C_2H_3F	HF	13.73 ± 0.1	VC	353	419
$C_2H_2^+$	$CH_2{=}CF_2$	2F	19.78 ± 0.1	VC	340	419
$C_2H_2^+$	$C_2H_3CF_3$	HCF_3	13.3 ± 0.15	SL	(a)	1075
$C_2H_2^+$	$C_2H_3BF_2$	HBF_2	13.75 ± 0.1	VC	(b)	1076
$C_2H_2^+$	C_2H_4S	SH + H	17.9 ± 0.5	EVD	346	51
(Ethylene sulfide)						
$C_2H_2^+$	C_3H_6S		17.7 ± 0.4	EVD		188
(Propylene sulfide)						
$C_2H_2^+$	$(CH_2)_3S$		17.1 ± 0.4	EVD		52
(Trimethylene sulfide)						
$C_2H_2^+$	$C_2H_5SCH_3$		17.8 ± 0.5	EVD		176
$C_2H_2^+$	$C_2H_5SSC_2H_5$		19.5 ± 0.5	EVD		186
$C_2H_2^+$	C_2H_5NCS		18.1 ± 0.2	EVD		315
$C_2H_2^+$	C_3H_5OCl		16.6 ± 0.1			153
(Epichlorohydrin)						
$C_2H_2^+$	C_3H_5OBr		16.7 ± 0.6	EVD		153
(Epibromohydrin)						
		$C_2D_2^+$				
$C_2D_2^+$	C_2D_2		11.416 ± 0.006	PI		54, 1019, 1118, 1400

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_3^+$ Heat of formation 269 kcal mol^{-1}						
$C_2H_3^+$	C_2H_3		9.45 ± 0.05	SL	283	70
$C_2H_3^+$	C_2H_3		9.35 ± 0.15	NS	281	1129
(EI on neutral fragment from n-C_6H_{14})						
$C_2H_3^+$	C_2H_3		9.4 ± 0.2	NS	282	87
(EI on neutral fragment from n-C_6H_{14})						
$C_2H_3^+$	C_2H_3		9.9 ± 0.5	NS	293	87
(EI on neutral fragment from C_3H_8)						
$C_2H_3^+$	C_2H_4	H	13.37 ± 0.03	PI	269*	2013
$C_2H_3^+$	C_2H_4	H	14.10 ± 0.15	RPD	286	166
$C_2H_3^+$	C_2H_4	H	15.58 ± 0.15	RPD		166
$C_2H_3^+$	C_2H_4	H	17.35 ± 0.28	RPD		166
$C_2H_3^+$	C_2H_4	H	18.53 ± 0.28	RPD		166
$C_2H_3^+$	C_2H_4	H(2s?)	24.35 ± 0.55	RPD	287	166
$C_2H_3^+$	C_2H_4	H	14.00 ± 0.05	EVD	283	70
$C_2H_3^+$	C_2H_4	H	14.06	VC	285	419
$C_2H_3^+$	C_3H_6	CH_3	13.80	LE	290	194
$C_2H_3^+$	C_3H_8	$CH_3 + H_2$	14.5 ± 0.15	VC	276	1408
$C_2H_3^+$	C_3H_8	$CH_3 + 2H$	19.5 ± 0.3	VC	287	1408
$C_2H_3^+$	C_3H_8	$H_2 + CH_3^+$	25.0 ± 0.5	VC	293	1408
$C_2H_3^+$	C_3H_8		30.8 ± 0.2	SRP		1264
(Excess KE ion)						
$C_2H_3^+$	$CH_2{=}CHCH{=}CH_2$	$C_2H_2 + H$	15.72 ± 0.08	SL	283	462
$C_2H_3^+$	$CH_3C{\equiv}CCH_3$	C_2H_3	14.7 ± 0.2	VC	309	13
$C_2H_3^+$	1-C_4H_8	C_2H_5	13.6	LE	289	194
$C_2H_3^+$	neo-C_5H_{12}	$3CH_3$	17.95	VC	275	2101
$C_2H_3^+$	C_6H_6		31.1 ± 0.2	SRP		1264
(Benzene-excess KE ion)						
$C_2H_3^+$	C_2H_5N	NH + H	16.9 ± 0.3	EVD	285	51
(Ethylenimine)						
$C_2H_3^+$	$(CH_2)_3NH$	$CH_2 + NH_2$?	16.6 ± 0.5	EVD	264	52
(Azetidine)						
$C_2H_3^+$	$(CH_2)_4NH$	$C_2H_5 + NH$?	16.7 ± 0.3	EVD	279	52
(Pyrrolidine)						
$C_2H_3^+$	C_2H_4O	OH	14.3 ± 0.2	EVD	308	50
(Ethylene oxide)						
$C_2H_3^+$	C_2H_5OH	$H_2O + H$	14.7	NS	288	46
$C_2H_3^+$	$CH_2{=}CHCHO$	CHO?	13.69 ± 0.13	NS	297	130
$C_2H_3^+$	C_3H_6O	$CH_2O + H$	14.3 ± 0.1	EVD	284	50
(Propylene oxide)						
$C_2H_3^+$	$(CH_2)_3O$	$CH_2O + H$	14.9 ± 0.3	EVD	296	52
(Trimethylene oxide)						
$C_2H_3^+$	n-C_3H_7OH	$CH_4 + OH$	14.7	NS	286	46
$C_2H_3^+$	iso-C_3H_7OH	$CH_4 + OH$	14.6	NS	280	46
$C_2H_3^+$	$CH_3COCH{=}CH_2$	$CH_3 + CO$	13.75	SL	284	298
$C_2H_3^+$	C_4H_6O	CH_3CO	12.6 ± 0.3	EVD	305	153
(3,4-epoxy-1-butene)						
$C_2H_3^+$	$(CH_2)_4O$		16.1 ± 0.3	EVD		52
(Tetrahydrofuran)						
$C_2H_3^+$	$C_4H_8O_2$		16.3 ± 0.2	EVD		153
(1,2-Epoxy-3-methoxypropane)						

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_3^+$	C_2H_3F	F	14.38 ± 0.1	VC	285	419
$C_2H_3^+$	$C_2H_3CF_3$	CF_3	14.20 ± 0.05	EVD	287	1075
$C_2H_3^+$	$C_2H_5CF_3$	$CF_3 + H_2$	15.3 ± 0.1	SL	276	1075
$C_2H_3^+$	$C_2H_3BF_2$	BF_2	14.25 ± 0.05	VC	(a)	1076
$C_2H_3^+$	*iso*-$C_3H_7BF_2$	$CH_4 + BF_2$	14.8 ± 0.1	VC	271	1076
$C_2H_3^+$	$(CH_3)_3SiH$		15.3 ± 0.5	EVD		83
$C_2H_3^+$ (Ethylene sulfide)	C_2H_4S	SH	14.6 ± 0.2	EVD	322	51
$C_2H_3^+$	$(CH_3)_2S$	$H_2S + H$	15.4 ± 0.3	EVD	299	84
$C_2H_3^+$	$(CH_3)_2S$	$HS + H_2$	14.7	SL	299	307
$C_2H_3^+$	CH_3SCD_3	$D_2S + D$	16.7	SL		307
$C_2H_3^+$ (Propylene sulfide)	C_3H_6S	$CH_2S + H$	17.2 ± 0.3	EVD		188
$C_2H_3^+$ (Trimethylene sulfide)	$(CH_2)_3S$	$CHS + H_2$	16.7 ± 0.2	EVD	(b)	52
$C_2H_3^+$	$C_2H_5SCH_3$	$CH_3S + H_2$	16.0 ± 0.4	EVD	322	176
$C_2H_3^+$	$CH_3SCH_2CH{=}CH_2$	$CH_3S + CH_2$	16.5 ± 0.4	EVD	265	186
$C_2H_3^+$ (Tetrahydrothiophene)	$(CH_2)_4S$		18.0 ± 0.4	EVD		52
$C_2H_3^+$	*n*-$C_3H_7SCH_3$		15.8 ± 0.4	EVD		176
$C_2H_3^+$	*iso*-$C_3H_7SCH_3$		16.5 ± 0.5	EVD		186
$C_2H_3^+$	$(C_2H_5)_2S$		16.7 ± 0.5	EVD		84
$C_2H_3^+$	$C_2H_5SSC_2H_5$		17.2 ± 0.4	EVD		186
$C_2H_3^+$	C_2H_5NCS	$NCS + H_2$	15.6 ± 0.3	LE	(b)	315
$C_2H_3^+$ (Epichlorohydrin)	C_3H_5OCl	$CH_2O + Cl$	14.0 ± 0.4	EVD	295	153
$C_2H_3^+$ (Epibromohydrin)	C_3H_5OBr	$CH_2O + Br$	14.4 ± 0.2	EVD	305	153
		$C_2H_2D^+$				
$C_2H_2D^+$	CH_3SCD_3	$D_2S + H$?	15.05	SL		307
		$C_2HD_2^+$				
$C_2HD_2^+$	CH_3SCD_3		13.5	SL		307
		$C_2D_3^+$				
$C_2D_3^+$	CH_3SCD_3		12.1	SL		307
		$C_2H_4^+$ Heat of formation 253 kcal mol^{-1}				
$C_2H_4^+$	C_2H_4		10.45	S	253*	2059
$C_2H_4^+$	C_2H_4		10.507 ± 0.004	PI	255	1253
$C_2H_4^+$	C_2H_4		10.511 ± 0.005	PI	255	2013
$C_2H_4^+$	C_2H_4		10.515 ± 0.01	PI	255	182, 416
$C_2H_4^+$	C_2H_4		10.45 ± 0.02	PI	253*	2059
$C_2H_4^+$	C_2H_4		10.50 ± 0.02	PI	255	268
$C_2H_4^+$	C_2H_4		10.46 ± 0.05	PI	254	156
$C_2H_4^+$	C_2H_4		10.48	PE	254*	1130
$C_2H_4^+$	C_2H_4		12.50	PE		1130
$C_2H_4^+$	C_2H_4		14.39	PE		1130
$C_2H_4^+$	C_2H_4		15.63	PE		1130
$C_2H_4^+$	C_2H_4		19.13	PE		1130

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_4^+$	C_2H_4		10.5 ± 0.25	EM	255	2187
$C_2H_4^+$	C_2H_4		10.48 ± 0.13	RPD	254	166
$C_2H_4^+$	C_2H_4		11.74 ± 0.17	RPD		166
$C_2H_4^+$	C_2H_4		13.31 ± 0.20	RPD		166
$C_2H_4^+$	C_2H_4		14.64 ± 0.58	RPD		166
$C_2H_4^+$	C_2H_4		19.28 ± 0.30	RPD		166
$C_2H_4^+$	C_2H_4		10.56 ± 0.05	EVD	256	268
$C_2H_4^+$	C_2H_4		10.66	VC	258	419
$C_2H_4^+$	C_2H_4		10.4 ± 0.3	NS	252	1129
(EI on neutral fragment from C_3H_8)						
$C_2H_4^+$	C_3H_6	CH_2	12.85	LE	207	194
$C_2H_4^+$	C_3H_8	CH_4	11.35 ± 0.15	VC	255	1408
$C_2H_4^+$	C_3H_8	$H_2 + CH_2^+$	27.2 ± 0.5	VC	269	1408
$C_2H_4^+$	$CH_2{=}CHCH{=}CH_2$	C_2H_2	12.45 ± 0.1	PI	259	2013
$C_2H_4^+$	1-C_4H_8	C_2H_4	12.38	LE	273	194
$C_2H_4^+$	*cis*-2-C_4H_8	C_2H_4	12.19	LE	267	194
$C_2H_4^+$	C_2H_5N	NH	13.3 ± 0.2	EVD	254	51
(Ethylenimine)						
$C_2H_4^+$	C_3H_6O	$CO + H_2$	11.6 ± 0.2	EVD	272	50
(Propylene oxide)						
$C_2H_4^+$	$(CH_2)_3O$	CH_2O	12.4 ± 0.3	EVD	290	52
(Trimethylene oxide)						
$C_2H_4^+$	$C_2H_5CF_3$	HCF_3	13.0 ± 0.2	EVD	273	1075
$C_2H_4^+$	$C_2H_5BF_2$	HBF_2	12.08 ± 0.01	VC	(b)	1076
$C_2H_4^+$	$(CH_2)_3S$	CH_2S	13.6 ± 0.2	EVD	(b)	52
(Trimethylene sulfide)						
$C_2H_4^+$	C_3H_5OCl	CHO + Cl	13.6 ± 0.4	EVD	262	153
(Epichlorohydrin)						
$C_2H_4^+$	$C_2H_5SiCl_3$	$HSiCl_3$?	12.48 ± 0.05	SL	279	2182
$C_2H_5^+$ Heat of formation 219 kcal mol^{-1}						
$C_2H_5^+$	C_2H_5		8.4	PI	219*	1068
$C_2H_5^+$	C_2H_5		8.25 ± 0.1	RPD	215	2158
$C_2H_5^+$	C_2H_5		8.7 ± 0.1	RPD		2158
$C_2H_5^+$	C_2H_5		9.3 ± 0.1	RPD		2158
$C_2H_5^+$	C_2H_5		8.78 ± 0.05	EVD	228	59
$C_2H_5^+$	C_2H_5		8.80 ± 0.05	EVD	228	1129
(EI on neutral fragment from *n*-C_6H_{14})						
$C_2H_5^+$	C_2H_5		8.7 ± 0.1	NS	226	87
(EI on neutral fragment from *n*-C_4H_{10})						
$C_2H_5^+$	C_2H_5		8.8 ± 0.1	NS	228	87
(EI on neutral fragment from *n*-C_6H_{14})						
$C_2H_5^+$	C_2H_5		8.5 ± 0.6	NS	221	1129
(EI on neutral fragment from C_3H_8)						
$C_2H_5^+$	C_2H_5		8.67	TC	225	136, 2038
$C_2H_5^+$	C_2H_5		11.42	TC	288	353
$C_2H_5^+$	C_2H_6	H	12.8	RPD	223	160
$C_2H_5^+$	C_2H_6	H	14.0	RPD		160
$C_2H_5^+$	C_2H_6	H	12.8	MSD	223	1451
$C_2H_5^+$	C_2H_6	H	12.97	LE	227	195

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_5^+$	C_2H_6	H^-?	12.2	RPD	228	160
$C_2H_5^+$	C_2H_6	H^-?	13.3	RPD		160
$C_2H_5^+$	C_2H_6	H^-?	14.0	RPD		160
$C_2H_5^+$	C_2H_6	H^-?	15.0	RPD		160
$C_2H_5^+$	C_2H_6	H^-?	15.6	RPD		160
$C_2H_5^+$	C_3H_8	CH_3	12.15 ± 0.15	VC	222	1408
$C_2H_5^+$	C_3H_8	CH_3	12.2	MSD	223	1451
$C_2H_5^+$	C_3H_8	CH_3	12.24	LE	224	195
$C_2H_5^+$	C_3H_8	CH_3^+	21 ± 2	VC	200	1408
$C_2H_5^+$	C_3H_8		26.9 ± 0.5	VC		1408
$C_2H_5^+$	$C_2H_5C{\equiv}CH$	C_2H	12.9 ± 0.1	VC	(b)	13
$C_2H_4^+$	*cis*-2-C_4H_8	C_2H_3	12.25	LE	216	194, 195
$C_2H_5^+$	*n*-C_4H_{10}	C_2H_5	12.55	LE	234	195
$C_2H_5^+$	*iso*-C_4H_{10}	C_2H_5	13.80	LE	261	195
$C_2H_5^+$ (Excess KE ion)	*n*-C_5H_{12}		28.1 ± 0.2	SRP		1264
$C_2H_5^+$	*neo*-C_5H_{12}	$CH_3 + C_2H_4$	13.81	VC	233	2101
$C_2H_5^+$ (Excess KE ion)	*n*-C_7H_{16}		24.3 ± 0.2	SRP		1264
$C_2H_5^+$	$C_2H_5N{=}NC_2H_5$	$C_2H_5 + N_2$	10.45 ± 0.2	SL	249	304
$C_2H_5^+$	C_2H_5OH	OH	12.4	RPD	220	2018
$C_2H_5^+$	C_2H_5OH	OH^-?	10.5	RPD	220	2018
$C_2H_5^+$	C_2H_5OH	OH^-?	11.6	RPD		2018
$C_2H_5^+$	C_2H_5OH	OH^-?	12.4	RPD		2018
$C_2H_5^+$	C_2H_5OH	OH^-?	13.2	RPD		2018
$C_2H_5^+$	C_2H_5OH	OH^-?	13.8	RPD		2018
$C_2H_5^+$	C_2H_5CHO	CHO	11.48 ± 0.11	NS	220	130
$C_2H_5^+$ (Trimethylene oxide)	$(CH_2)_3O$	$CO + H$	12.6 ± 0.2	EVD	241	52
$C_2H_5^+$	$CH_3COC_2H_5$	$CH_3 + CO$?	12.95 ± 0.1	SL	235	298
$C_2H_5^+$ (Tetrahydrofuran)	$(CH_2)_4O$		15.8 ± 0.2	EVD		52
$C_2H_5^+$	$CH_3COOC_2H_5$	$CH_3 + CO_2$	12.1	RPD	243	2018
$C_2H_5^+$	$CH_3COOC_2H_5$	$CH_3CO_2^-$?	8.9	RPD		2018
$C_2H_5^+$	$CH_3COOC_2H_5$	$CH_3CO_2^-$?	10.0	RPD		2018
$C_2H_5^+$	$CH_3COOC_2H_5$	$CH_3CO_2^-$?	10.6	RPD		2018
$C_2H_5^+$	$CH_3COOC_2H_5$	$CH_3CO_2^-$?	11.6	RPD		2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2	11.0	RPD	222	2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2^-?	7.0	RPD		2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2^-?	8.1	RPD		2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2^-?	8.8	RPD		2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2^-?	9.8	RPD		2018
$C_2H_5^+$	$C_2H_5NO_2$	NO_2^-?	10.4	RPD		2018
$C_2H_5^+$	$C_2H_5ONO_2$	NO_3?	11.86 ± 0.25	VC	(b)	1013
$C_2H_5^+$	*n*-$C_5H_{11}F$		14.67	SL		2029
$C_2H_5^+$	$C_2H_5CF_3$	CF_3	12.82 ± 0.02	SL	(a)	1075
$C_2H_5^+$	$C_2H_5BF_2$	BF_2	13.1 ± 0.2	VC	(a)	1076
$C_2H_5^+$	$C_2H_5SiH_3$	SiH_3	12.6 ± 0.2	SL	(b)	2182
$C_2H_5^+$	$C_2H_5SCH_3$	$CH_3 + S$	14.1 ± 0.2	EVD	226	176
$C_2H_5^+$	*n*-$C_3H_7SCH_3$		15.3 ± 0.5	EVD		176
$C_2H_5^+$	$(C_2H_5)_2S$	$C_2H_5 + S$	14.5 ± 0.3	EVD	237	84
$C_2H_5^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$	$C_6H_5 + S$	13.7	SL	(b)	307

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_5^+$	$C_2H_5SSC_2H_5$	C_2H_5S+S	14.2±0.2	EVD	218	186
$C_2H_5^+$	C_2H_5NCS	NCS	12.9±0.2	EVD	(b)	315
$C_2H_5^+$	C_2H_5Cl	Cl	12.3	RPD	229	160
$C_2H_5^+$	C_2H_5Cl	Cl	12.2±0.2	VC	227	356
$C_2H_5^+$	C_2H_5Cl	Cl⁻?	8.5	RPD	228	160
$C_2H_5^+$	C_2H_5Cl	Cl⁻?	9.6	RPD		160
$C_2H_5^+$	C_2H_5Cl	Cl⁻?	10.4	RPD		160
$C_2H_5^+$	C_2H_5Cl	Cl⁻?	11.4	RPD		160
$C_2H_5^+$	C_2H_5Cl	Cl⁻?	11.9	RPD		160
$C_2H_5^+$	n-C_3H_7Cl	CH_2Cl	12.48±0.1	SL	(b)	72
$C_2H_5^+$	$C_2H_5SiCl_3$	$SiCl_3$	12.77±0.05	SL	(b)	2182
$C_2H_5^+$	C_2H_5Br	Br	11.5	RPD	226	160
$C_2H_5^+$	C_2H_5Br	Br	11.4±0.1	VC	223	356
$C_2H_5^+$	C_2H_5Br	Br⁻?	8.2	RPD	230	160
$C_2H_5^+$	C_2H_5Br	Br⁻?	9.3	RPD		160
$C_2H_5^+$	C_2H_5Br	Br⁻?	10.0	RPD		160
$C_2H_5^+$	C_2H_5Br	Br⁻?	11.1	RPD		160
$C_2H_5^+$	C_2H_5Br	Br⁻?	11.5	RPD		160
$C_2H_5^+$	C_2H_5I	$I(^2P_{3/2})$	11.0	RPD	228	160
$C_2H_5^+$	C_2H_5I	I	11.0±0.3	VC	228	356
$C_2H_5^+$	C_2H_5I	$I(^2P_{1/2})$	12.0	RPD	230	160
$C_2H_5^+$	C_2H_5I	I⁻?	7.8	RPD	225	160
$C_2H_5^+$	C_2H_5I	I⁻?	8.9	RPD		160
$C_2H_5^+$	C_2H_5I	I⁻?	9.7	RPD		160
$C_2H_5^+$	C_2H_5I	I⁻?	10.6	RPD		160
$C_2H_5^+$	C_2H_5I	I⁻?	11.3	RPD		160
$C_2H_5^+$	$(C_2H_5)_2Hg$		10.25±0.1	SL		306
$C_2H_6^+$ Heat of formation 245 kcal mol^{-1}						
$C_2H_6^+$	C_2H_6		11.521±0.007	PI	245*	1253
$C_2H_6^+$	C_2H_6		11.65±0.03	PI	248*	182
$C_2H_6^+$	C_2H_6		11.49	PE	245*	1130
$C_2H_6^+$	C_2H_6		14.74	PE		1130
$C_2H_6^+$	C_2H_6		19.18	PE		1130
$C_2H_6^+$	C_2H_6		20.13	PE		1130
$C_2H_6^+$	C_2H_6		11.65	TC	248	2038
$C_2H_6^+$	C_2H_6		11.76	TC	251	1352, 2020
$C_2H_6^+$	C_2H_6		12.64	TC		1352, 2020
$C_2H_6^+$	C_2H_6		17.33	TC		1352, 2020
$C_2H_6^+$	C_2H_6		24.02	TC		1352, 2020
$C_2H_6^+$	C_2H_6		11.78	TC	251	136
$C_2H_6^+$	C_2H_6		12.04	TC	257	1006
$C_2H_6^+$	C_2H_6		12.21	TC	261	473
$C_2H_6^+$	C_2H_6		12.57	TC	270	353
$C_2H_6^+$	$(CH_2)_3O$ (Trimethylene oxide)	CO	10.8±0.3	EVD	252	52

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_3H^+				
C_3H^+	$CH_3C{\equiv}CH$	$H_2 + H$?	15.4 ± 0.3	VC	347	13
C_3H^+	$CH_2{=}CHC{\equiv}CH$		18.71	VC		2102
C_3H^+	$CH_2{=}CHCH{=}CH_2$	$CH_3 + H_2$	12.44	VC	280	2102
C_3H^+	$CH_2{=}CHCH{=}CH_2$	$CH_3 + 2H$	18.96	VC	326	2102
C_3H^+	$C_2H_5C{\equiv}CH$	$CH_3 + H_2$	12.59	VC	297	2102
C_3H^+	$C_2H_5C{\equiv}CH$	$CH_3 + 2H$	17.62	VC	308	2102
C_3H^+ (Propylene sulfide)	C_3H_6S		22.2 ± 0.5	EVD		188
C_3H^+	$CH_3SCH_2CH{=}CH_2$	$CH_3S + 2H_2$?	16.6 ± 0.5	EVD	360	186
		$C_3H_2^+$ Heat of formation 365 kcal mol^{-1}				
$C_3H_2^+$	$CH_3C{\equiv}CH$	H_2	14.0 ± 0.1	VC	367*	13
$C_3H_2^+$ (3,4-Epoxy-1-butene)	C_4H_6O	$CH_2O + H_2$	15.8 ± 0.5	EVD	402	153
$C_3H_2^+$ (Propylene sulfide)	C_3H_6S	$H_2S + 2H$?	19.2 ± 0.4	EVD	363*	188
$C_3H_2^+$	$CH_3SCH_2CH{=}CH_2$	$CH_3S + H + H_2$?	20.3 ± 0.5	EVD	394	186
		$C_3H_3^+$ Heat of formation 255 kcal mol^{-1}				
$C_3H_3^+$	$CH_2C{\equiv}CH$		8.34	TC	267	136
$C_3H_3^+$ (Cyclopropenyl radical)	C_3H_3		5.80	TC		136
$C_3H_3^+$	$CH_2{=}C{=}CH_2$	H	12.02 ± 0.03	SL	271	165
$C_3H_3^+$	$CH_3C{\equiv}CH$	H	12.00 ± 0.05	SL	269	462
$C_3H_3^+$	$CH_3C{\equiv}CH$	H	12.06 ± 0.06	SL	270	17
$C_3H_3^+$	$CH_3C{\equiv}CH$	H	11.8 ± 0.1	VC	264	13
$C_3H_3^+$ (Cyclopropene)	C_3H_4	H	11.15 ± 0.06	NS	272	165
$C_3H_3^+$	C_3H_6	$H_2 + H$	14.21	LE	280	194
$C_3H_3^+$	$CH_3CH{=}C{=}CH_2$	CH_3	11.00 ± 0.03	SL	259	462
$C_3H_3^+$	$CH_2{=}CHCH{=}CH_2$	CH_3	11.35 ± 0.05	PI	255*	2013
$C_3H_3^+$	$CH_2{=}CHCH{=}CH_2$	CH_3	11.71 ± 0.02	SL	263	462
$C_3H_3^+$	$C_2H_5C{\equiv}CH$	CH_3	11.02 ± 0.05	SL	260	462
$C_3H_3^+$	$C_2H_5C{\equiv}CH$	CH_3	10.8 ± 0.2	VC	255	13
$C_3H_3^+$	$CH_3C{\equiv}CCH_3$	CH_3	11.4 ± 0.2	VC	265	13
$C_3H_3^+$	1-C_4H_8	$CH_3 + H_2$	13.82	LE	285	195
$C_3H_3^+$	*cis*-2-C_4H_8	$CH_3 + H_2$	13.75	LE	282	195
$C_3H_3^+$	*neo*-C_5H_{12}	$CH_3 + 2H_2$	17.08	VC	321	2101
$C_3H_3^+$	$CH{\equiv}CCH{=}CHCH{=}CH_2$	C_3H_3	14.57	EVD	349	1197
$C_3H_3^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	C_3H_3	12.20	EVD	(b)	1197
$C_3H_3^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$	C_3H_3	12.05	EVD	(b)	1197
$C_3H_3^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	C_3H_3	11.99	EVD	(b)	1197
$C_3H_3^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	C_3H_3	12.17	EVD	(b)	1197
$C_3H_3^+$ (Benzene)	C_6H_6	C_3H_3	15.17 ± 0.1	EVD	(b)	1238
$C_3H_3^+$ (Benzene)	C_6H_6	C_3H_3	16	EVD	(b)	1197
$C_3H_3^+$ (Benzene)	C_6H_6	C_3H_3	16.1 ± 0.3	SL	316	2103
$C_3H_3^+$ (Cubane)	C_8H_8	$C_3H_3 + C_2H_2$	11.14 ± 0.18	EVD	(b)	2105

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_3^+$ (Pyrrolidine)	$(CH_2)_4NH$		18.9 ± 0.4	EVD		52
$C_3H_3^+$ (Pyridine)	C_5H_5N	C_2H_2N?	14.00 ± 0.10	EVD	(b)	1406
$C_3H_3^+$ (Trimethylene oxide)	$(CH_2)_3O$	$OH + H_2$	14.5 ± 0.2	EVD	301	52
$C_3H_3^+$	n-C_3H_7OH	$OH + 2H_2$	15.6 ± 0.3	LE	288	46
$C_3H_3^+$ (3,4-Epoxy-1-butene)	C_4H_6O	$CH_2O + H$	13.5 ± 0.3	EVD	297	153
$C_3H_3^+$ (Tetrahydrofuran)	$(CH_2)_4O$	$CH_3O + 2H$?	18.7 ± 0.6	EVD	284	52
$C_3H_3^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		15.9 ± 0.4	EVD		153
$C_3H_3^+$ (Flourobenzene)	C_6H_5F		14.27 ± 0.1	SL		2103
$C_3H_3^+$ (Propylene sulfide)	C_3H_6S	$H_2 + H + S$	15.9 ± 0.2	EVD	268	188
$C_3H_3^+$ (Trimethylene sulfide)	$(CH_2)_3S$	$H_2 + H + S$	15.3 ± 0.4	EVD	249	52
$C_3H_3^+$ (Thiophene)	C_4H_4S	CHS	12.8 ± 0.2	EVD	(b)	2166
$C_3H_3^+$	$CH_3SCH_2CH{=}CH_2$		16.5 ± 0.4	EVD		186
$C_3H_3^+$ (Tetrahydrothiophene)	$(CH_2)_4S$	$CHS + 2H_2$	17.2 ± 0.2	EVD	(b)	52
$C_3H_3^+$	n-$C_3H_7SCH_3$		18.4 ± 0.5	EVD		176
$C_3H_3^+$	iso-$C_3H_7SCH_3$		21.0 ± 0.5	EVD		186
$C_3H_3^+$	$CH_3C{\equiv}CCl$	Cl	11.0 ± 0.2	VC	262	13
$C_3H_3^+$ (Cyclopentadienylvanadium tetracarbonyl)	$C_5H_5V(CO)_4$		13.5 ± 0.3	EVD		1381
$C_3H_3^+$ (Cyclopentadienylmanganese tricarbonyl)	$C_5H_5Mn(CO)_3$		20.3 ± 0.4	EVD		1381
$C_3H_3^+$	$CH_3C{\equiv}CBr$	Br	11.1 ± 0.2	VC	278	13
		$C_3HD_2^+$				
$C_3HD_2^+$	$CD_3C{\equiv}CH$	D	12.22 ± 0.05	SL		17
		$C_3D_3^+$				
$C_3D_3^+$	$CD_3C{\equiv}CH$	H	12.16 ± 0.06	SL		17

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	$CH_2{=}C{=}CH_2^+$ Heat of formation 280 kcal mol^{-1}					
	$CH_3C{\equiv}CH^+$ 283 kcal mol^{-1}					
	***cyclo*-$C_3H_4^+$ 296 kcal mol^{-1}**					
$C_3H_4^+$	$CH_2{=}C{=}CH_2$		10.16 ± 0.02	SL	280*	462
$C_3H_4^+$	$CH_2{=}C{=}CH_2$		10.19	TC	281	136
$C_3H_4^+$	$CH_3C{\equiv}CH$		10.36 ± 0.01	PI	283*	162, 182, 416, 22
$C_3H_4^+$	$CH_3C{\equiv}CH$		10.54 ± 0.03	SL	287	17
$C_3H_4^+$	$CH_3C{\equiv}CH$		10.3 ± 0.1	VC	282	13
$C_3H_4^+$	$CH_3C{\equiv}CH$		10.44	TC	285	136
$C_3H_4^+$ (Cyclopropene)	C_3H_4		9.95	SL	296*	62
$C_3H_4^+$ (EI on neutral fragment from C_3H_8)	C_3H_4		10.28 ± 0.1	NS		1129
$C_3H_4^+$ (EI on neutral fragment from n-C_4H_{10})	C_3H_4		8.2 ± 0.2	NS		87
$C_3H_4^+$ (EI on neutral fragment from n-C_6H_{14})	C_3H_4		8.2 ± 0.4	NS		87
$C_3H_4^+$ (EI on neutral fragment from benzene)	C_3H_4		8.7 ± 0.5	NS		87
$C_3H_4^+$	C_3H_6	H_2	12.52	LE	294	194, 195
$C_3H_4^+$ (3,4-*Epoxy*-1-butene)	C_4H_6O	$CO + H_2$	11.3 ± 0.3	EVD	297	153
$C_3H_4^+$ (Tetrahydrofuran)	$(CH_2)_4O$		15.2 ± 0.3	EVD		52
$C_3H_4^+$ (Propylene sulfide)	C_3H_6S	$S + H_2$	14.4 ± 0.3	EVD	285	188
	$C_3HD_3^+$					
$C_3HD_3^+$	$CD_3C{\equiv}CH$		10.62 ± 0.05	SL		17
	$C_3H_5^+$ Heat of formation 216 kcal mol^{-1}					
	***cyclo*-$C_3H_5^+$ 239 kcal mol^{-1}**					
$C_3H_5^+$	$CH_2{=}CHCH_2$		8.15 ± 0.03	SL	(a)	2114
$C_3H_5^+$ (Cyclopropyl radical)	C_3H_5		8.05 ± 0.1	SL	(a)	123
$C_3H_5^+$ (Cyclopropyl radical)	C_3H_5		8.05	TC	254	2184
$C_3H_5^+$ (Cyclopropyl radical)	C_3H_5		8.31	TC	260	123
$C_3H_5^+$ (EI on neutral fragment from C_3H_8)	C_3H_5		8.0 ± 0.1	NS		87, 1129
$C_3H_5^+$ (EI on neutral fragment from n-C_6H_{14})	C_3H_5		8.15 ± 0.1	NS		1129
$C_3H_5^+$ (EI on neutral fragment from n-C_4H_{10})	C_3H_5		8.2 ± 0.1	NS		87
$C_3H_5^+$ (EI on neutral fragment from n-C_6H_{14})	C_3H_5		8.2 ± 0.1	NS		87
$C_3H_5^+$	C_3H_6	H	11.4 ± 0.5	MSD	216*	1451
$C_3H_5^+$	C_3H_6	H	12.11	LE	232	194, 195
$C_3H_5^+$ (Cyclopropane)	C_3H_6	H	12.06	SL	239*	123

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_5^+$	C_3H_8	H_2+H	14.76	LE	263	195
$C_3H_5^+$	1-C_4H_8	CH_3	11.4±0.5	MSD	230	1451
$C_3H_5^+$	1-C_4H_8	CH_3	11.73	LE	237	194, 195
$C_3H_5^+$	*cis*-2-C_4H_8	CH_3	11.60	LE	233	194, 195
$C_3H_5^+$	*n*-C_4H_{10}	CH_3+H_2	13.40	LE	246	195
$C_3H_5^+$	*iso*-C_4H_{10}	CH_3+H_2	14.55	LE	270	195
$C_3H_5^+$	*neo*-C_5H_{12}	CH_3+CH_4	13.13	VC	248	2101
$C_3H_5^+$	*n*-C_7H_{16}		12.7±0.1	PI	248	2013
$C_3H_5^+$	C_3H_5CN (Cyclopropyl cyanide)	CN	12.70±0.15	EVD	236	202
$C_3H_5^+$	$(CH_2)_3O$ (Trimethylene oxide)	OH	11.8±0.2	EVD	239	52
$C_3H_5^+$	C_4H_6O (3,4-Epoxy-1-butene)	CO+H	11.1±0.2	EVD	240	153
$C_3H_5^+$	$(CH_2)_4O$ (Tetrahydrofuran)		15.5±0.3	EVD		52
$C_3H_5^+$	*n*-$C_5H_{11}F$		14.12	SL	252	2029
$C_3H_5^+$	C_3H_6S (Propylene sulfide)	SH	11.5±0.2	EVD	251	188
$C_3H_5^+$	$(CH_2)_3S$ (Trimethylene sulfide)	SH	12.2±0.2	EVD	262	52
$C_3H_5^+$	$CH_3SCH_2CH=CH_2$		12.7±0.3	EVD		186
$C_3H_5^+$	$(CH_2)_4S$ (Tetrahydrothiophene)		15.5±0.2	EVD		52
$C_3H_5^+$	*n*-$C_3H_7SCH_3$		14.8±0.2	EVD		176
$C_3H_5^+$	*iso*-$C_3H_7SCH_3$		15.2±0.2	EVD		186
	$C_3H_6^+$ Heat of formation 229 kcal mol^{-1}					
	***cyclo*-$C_3H_6^+$ 245 kcal mol^{-1}**					
$C_3H_6^+$	C_3H_6		9.74	S	229*	133
$C_3H_6^+$	C_3H_6		9.80	S		133
$C_3H_6^+$	C_3H_6		9.727±0.01	PI	229*	1253
$C_3H_6^+$	C_3H_6		9.73±0.01	PI	229*	182, 416
$C_3H_6^+$	C_3H_6		9.73±0.02	PI	229*	1120
$C_3H_6^+$	C_3H_6		9.73	PI	229*	133
$C_3H_6^+$	C_3H_6		9.80	PI		133
$C_3H_6^+$	C_3H_6		9.73	PI	229*	168
$C_3H_6^+$	C_3H_6		9.81±0.09	SL	231	411
$C_3H_6^+$	C_3H_6		9.74	LE	229	194, 195
$C_3H_6^+$	C_3H_6		9.96	TC	235	136
$C_3H_6^+$	C_3H_6		10.14	TC	239	353
$C_3H_6^+$	C_3H_6 (Cyclopropane)		10.09±0.02	PI	245*	182, 416
$C_3H_6^+$	C_3H_6 (Cyclopropane)		10.53	SL	256	123
$C_3H_6^+$	C_3H_6 (Cyclopropane)		11.29	TC	273	136
$C_3H_6^+$	C_3H_6 (Cyclopropane)		11.45	TC	277	473
$C_3H_6^+$	C_3H_6 (EI on neutral fragment from C_3H_8)		9.81±0.15	NS		1129

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_6^+$	C_3H_8	H_2	12.2	LE	256	195
$C_3H_6^+$	n-C_4H_{10}	CH_4	11.095 ± 0.005	PI	244	1120
$C_3H_6^+$	n-C_4H_{10}	CH_4	10.77	LE	236	195
$C_3H_6^+$	*iso*-C_4H_{10}	CH_4	10.89 ± 0.01	PI	237	1120
$C_3H_6^+$	*iso*-C_4H_{10}	CH_4	10.88	LE	237	195
$C_3H_6^+$	C_5H_{10} (1,1-Dimethylcyclopropane)	C_2H_4	11.23 ± 0.07	EVD	239	1146
$C_3H_6^+$	C_5H_{10} (*cis*-1,2-Dimethylcyclopropane)	C_2H_4	11.24 ± 0.03	EVD	239	1146
$C_3H_6^+$	C_5H_{10} (*trans*-1,2-Dimethylcyclopropane)	C_2H_4	11.30 ± 0.05	EVD	241	1146
$C_3H_6^+$	n-C_5H_{12}	C_2H_6	10.89 ± 0.01	PI	236	1120
$C_3H_6^+$	*iso*-C_5H_{12}	C_2H_6	10.745 ± 0.01	PI	231	1120
$C_3H_6^+$	n-C_6H_{14}	C_3H_8	10.95 ± 0.02	PI	237	1120
$C_3H_6^+$	*iso*-C_6H_{14}	C_3H_8	10.86 ± 0.015	PI	234	1120
$C_3H_6^+$	$(CH_3)_2CHCH(CH_3)_2$	C_3H_8	10.595 ± 0.005	PI	227	1120
$C_3H_6^+$	n-C_7H_{16}	n-C_4H_{10}	10.96 ± 0.015	PI	238	1120
$C_3H_6^+$	n-C_7H_{16}	n-C_4H_{10}	10.65 ± 0.1	PI	231	2013
$C_3H_6^+$	n-C_3H_7OH	H_2O	10.50	PI	238	11
$C_3H_6^+$	$(CH_2)_4O$ (Tetrahydrofuran)	CH_2O	12.7 ± 0.2	EVD	278	52
$C_3H_6^+$	n-$C_5H_{11}F$	C_2H_5F	11.47	SL	250	2029
$C_3H_6^+$	*iso*-$C_3H_7BF_2$	HBF_2	11.48 ± 0.02	LE	(b)	1076
$C_3H_6^+$	*iso*-$C_3H_7SiH_3$	SiH_4	10.81 ± 0.04	SL	211	2182
$C_3H_6^+$	n-$C_3H_7SCH_3$	$CH_4 + S$	12.5 ± 0.4	EVD	220	176
$C_3H_6^+$	*iso*-$C_3H_7SCH_3$	$CH_2 + H_2S$	13.5 ± 0.2	EVD	201	186
$C_3H_6^+$	*iso*-$C_3H_7SiCl_3$	$HSiCl_3$	10.92 ± 0.1	SL	236	2182
	n-$C_3H_7^+$ Heat of formation 209 kcal mol^{-1}					
	iso-$C_3H_7^+$ 190 kcal mol^{-1}					
$C_3H_7^+$	n-C_3H_7		8.1	PI	209*	1068
$C_3H_7^+$	n-C_3H_7		8.15 ± 0.1	RPD	210	2158
$C_3H_7^+$	n-C_3H_7		8.6 ± 0.1	RPD		2158
$C_3H_7^+$	n-C_3H_7		8.8 ± 0.1	RPD		2158
$C_3H_7^+$	n-C_3H_7		9.2 ± 0.1	RPD		2158
$C_3H_7^+$	n-C_3H_7		9.5 ± 0.1	RPD		2158
$C_3H_7^+$	n-C_3H_7		8.69 ± 0.05	SL	222	141, 145
$C_3H_7^+$	n-C_3H_7		8.20	TC	211	1439
$C_3H_7^+$	n-C_3H_7		8.51	TC	218	1006
$C_3H_7^+$	n-C_3H_7		8.61	TC	221	2038
$C_3H_7^+$	n-C_3H_7		8.68	TC	222	141, 145
$C_3H_7^+$	*iso*-C_3H_7		7.5	PI	190*	1068
$C_3H_7^+$	*iso*-C_3H_7		7.52 ± 0.1	RPD	190	2158
$C_3H_7^+$	*iso*-C_3H_7		8.1 ± 0.1	RPD		2158
$C_3H_7^+$	*iso*-C_3H_7		8.6 ± 0.1	RPD		2158
$C_3H_7^+$	*iso*-C_3H_7		7.5	TC	190	1439
$C_3H_7^+$	*iso*-C_3H_7		7.76	TC	196	1006
$C_3H_7^+$	*iso*-C_3H_7		7.78	TC	196	136
$C_3H_7^+$	*iso*-C_3H_7		7.97	TC	201	141, 145
$C_3H_7^+$	*iso*-C_3H_7		8.14	TC	204	2038
$C_3H_7^+$	*iso*-C_3H_7		8.25	TC	207	2038
$C_3H_7^+$	C_3H_8	H	11.53 ± 0.01	PI	189	1120
$C_3H_7^+$	C_3H_8	H	11.76	LE	194	195

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_7^+$	*n*-C_4H_{10}	CH_3	11.10 ± 0.01	PI	193	1120
$C_3H_7^+$	*n*-C_4H_{10}	CH_3	11.23 ± 0.04	PI		1120
$C_3H_7^+$	*n*-C_4H_{10}	CH_3	10.86	LE	187	195
$C_3H_7^+$	*iso*-C_4H_{10}	CH_3	11.155 ± 0.015	PI	192	1120
$C_3H_7^+$	*iso*-C_4H_{10}	CH_3	11.16	LE	192	195
$C_3H_7^+$	*n*-C_5H_{12}	C_2H_5	11.04 ± 0.03	PI	195	1120
$C_3H_7^+$	*n*-C_5H_{12}	C_2H_5	11.29 ± 0.04	PI		1120
$C_3H_7^+$	*iso*-C_5H_{12}	C_2H_5	11.145 ± 0.02	PI	196	1120
$C_3H_7^+$	*n*-C_6H_{14}	*n*-C_3H_7	11.14 ± 0.03	PI	195	1120
$C_3H_7^+$	*n*-C_6H_{14}	*n*-C_3H_7	11.345 ± 0.04	PI		1120
$C_3H_7^+$	$(CH_3)_2CHCH(CH_3)_2$	*iso*-C_3H_7	11.24 ± 0.04	PI	200	1120
$C_3H_7^+$	*n*-C_7H_{16}	$C_3H_6 + CH_3$	11.05 ± 0.05	PI	172	2013
$C_3H_7^+$	$(CH_3)_3N_2H$	N_2H_3?	10.7 ± 0.3	SL		424
$C_3H_7^+$	$(CH_3)_4N_2$	$CH_3N_2H_2$	10.9 ± 0.2	SL		424
$C_3H_7^+$	$(CH_3)_4N_2$		13.2 ± 0.3	SL		424
$C_3H_7^+$	$(CH_3)_2CHN{=}NCH(CH_3)_2$	*iso*-$C_3H_7 + N_2$?	9.35 ± 0.1	SL	221	304
$C_3H_7^+$	*n*-C_3H_7OH	OH	11.8	RPD	201	2018
$C_3H_7^+$	*n*-C_3H_7OH	OH	12.8	RPD		2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	10.0	RPD	202	2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	11.2	RPD		2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	11.8	RPD		2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	12.5	RPD		2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	12.8	RPD		2018
$C_3H_7^+$	*n*-C_3H_7OH	OH^-?	13.4	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2	10.6	RPD	201	2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	6.7	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	8.1	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	8.6	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	9.0	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	9.5	RPD		2018
$C_3H_7^+$	*n*-$C_3H_7NO_2$	NO_2^-?	10.1	RPD		2018
$C_3H_7^+$	*n*-$C_5H_{11}F$	C_2H_4F?	12.02	SL	(b)	2029
$C_3H_7^+$	*iso*-$C_3H_7BF_2$	BF_2	12.05 ± 0.05	VC	(a)	1076
$C_3H_7^+$	*iso*-$C_3H_7SiH_3$	SiH_3	11.33 ± 0.03	SL	(b)	2182
$C_3H_7^+$	*n*-$C_3H_7SCH_3$	CH_3S	12.3 ± 0.4	EVD	232	176
$C_3H_7^+$	*iso*-$C_3H_7SCH_3$	CH_3S	12.7 ± 0.2	EVD	239	186
$C_3H_7^+$	$(n\text{-}C_3H_7)_2S$	*n*-C_3H_3S?	12.0	SL	(b)	307
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl	11.3	RPD	195	160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	7.7	RPD	200	160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	9.1	RPD		160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	9.6	RPD		160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	10.0	RPD		160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	10.7	RPD		160
$C_3H_7^+$	*iso*-C_3H_7Cl	Cl^-	11.0	RPD		160
$C_3H_7^+$	*n*-C_4H_9Cl	CH_2Cl	11.92 ± 0.1	SL	210	72
$C_3H_7^+$	*iso*-C_4H_9Cl	CH_2Cl	11.26 ± 0.1	SL	(b)	72
$C_3H_7^+$	*iso*-$C_3H_7SiCl_3$	$SiCl_3$	11.36 ± 0.1	SL	(b)	2182
$C_3H_7^+$	*n*-C_3H_7Br	Br	11.3	RPD	215	160
$C_3H_7^+$	*n*-C_3H_7Br	Br^-	7.8	RPD	217	160
$C_3H_7^+$	*n*-C_3H_7Br	Br^-	9.6	RPD		160
$C_3H_7^+$	*n*-C_3H_7Br	Br^-	9.9	RPD		160
$C_3H_7^+$	*n*-C_3H_7Br	Br^-	10.3	RPD		160
$C_3H_7^+$	*n*-C_3H_7Br	Br^-	10.75	RPD		160

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_7^+$	n-C_3H_7I	I	10.4	RPD	208	160
$C_3H_7^+$	n-C_3H_7I	I^-	7.2	RPD	207	160
$C_3H_7^+$	n-C_3H_7I	I^-	8.6	RPD		160
$C_3H_7^+$	n-C_3H_7I	I^-	9.1	RPD		160
$C_3H_7^+$	n-C_3H_7I	I^-	9.6	RPD		160
$C_3H_7^+$	n-C_3H_7I	I^-	10.0	RPD		160
$C_3H_7^+$	(iso-C_3H_7)$_2$Hg	iso-C_3H_7Hg	9.65 ± 0.1	SL	(b)	306
	$C_3H_8^+$ Heat of formation 231 kcal mol^{-1}					
$C_3H_8^+$	C_3H_8		11.140 ± 0.007	PI	232*	1253
$C_3H_8^+$	C_3H_8		11.08 ± 0.03	PI	231*	416
$C_3H_8^+$	C_3H_8		11.07 ± 0.05	PI	230*	182
$C_3H_8^+$	C_3H_8		11.07	PE	230*	1130
$C_3H_8^+$	C_3H_8		13.17	PE		1130
$C_3H_8^+$	C_3H_8		15.17	PE		1130
$C_3H_8^+$	C_3H_8		15.70	PE		1130
$C_3H_8^+$	C_3H_8		18.57	PE		1130
$C_3H_8^+$	C_3H_8		20.26	PE		1130
$C_3H_8^+$	C_3H_8		11.20	LE	233	195
$C_3H_8^+$	C_3H_8		10.98	TC	228	2038
$C_3H_8^+$	C_3H_8		11.00	TC	229	2038
$C_3H_8^+$	C_3H_8		11.04	TC	230	136
$C_3H_8^+$	C_3H_8		11.21	TC	234	1352, 2020
$C_3H_8^+$	C_3H_8		11.72	TC		1352, 2020
$C_3H_8^+$	C_3H_8		12.24	TC		1352, 2020
$C_3H_8^+$	C_3H_8		12.64	TC		1352, 2020
$C_3H_8^+$	C_3H_8		16.60	TC		1352, 2020
$C_3H_8^+$	C_3H_8		20.38	TC		1352, 2020
$C_3H_8^+$	C_3H_8		26.22	TC		1352, 2020
$C_3H_8^+$	C_3H_8		11.22	TC	234	473
	C_4H^+					
C_4H^+	CH≡CC≡CH	H	12.1 ± 0.3	VC	329	13
C_4H^+	CH_2=CHC≡CH	H_2 + H	12.13	VC	297	2102
C_4H^+	CH_2=CHC≡CH	3H	17.02	VC	305	2102
C_4H^+	CH_2=CHCH=CH_2	$2H_2$ + H	15.75	VC	337	2102
C_4H^+	CH_2=CHCH=CH_2	5H	25.30	VC	349	2102
C_4H^+	C_2H_5C≡CH	$2H_2$ + H	13.20	VC	291	2102
C_4H^+	C_2H_5C≡CH	5H	22.68	VC	302	2102
	$C_4H_2^+$ Heat of formation 337 kcal mol^{-1}					
$C_4H_2^+$	CH≡CC≡CH		10.2 ± 0.1	VC.	337*	13
$C_4H_2^+$	CH≡CC≡CH		9.78	TC	328	136
$C_4H_2^+$	CH_2=CHC≡CH	H_2	12.84	VC	365	2102
$C_4H_2^+$	CH_3C≡CCH_3	H_2 + 2H	16.7 ± 0.3	VC	316	13
$C_4H_2^+$	CH≡CCH=CHCH=CH_2		17.55	EVD		1197
$C_4H_2^+$	C_2H_5C≡CC≡CH	C_2H_2 + H_2	14.15	EVD	366	1197
$C_4H_2^+$	CH_3C≡CCH_2C≡CH	C_2H_2 + H_2	15.10	EVD	388	1197
$C_4H_2^+$	CH≡CCH_2CH_2C≡CH	C_2H_2 + H_2	15.02	EVD	391	1197
$C_4H_2^+$ (Cubane)	C_8H_8	$2C_2H_2$ + H_2	16.85 ± 0.08	EVD	429	2105
$C_4H_2^+$ (Pyridine)	C_5H_5N	HCN + H_2	16.17 ± 0.10	EVD	374	1406
$C_4H_2^+$ (Orthodiazine)	$C_4H_4N_2$	H_2 + N_2	13.67 ± 0.10	EVD	382	1406

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_3^+$ Heat of formation 307 kcal mol^{-1}						
$C_4H_3^+$	$CH_2{=}CHC{\equiv}CH$	H	12.59	VC	307*	2102
$C_4H_3^+$	$C_2H_5C{\equiv}CH$	H_2+H	14.6 ± 0.2	VC	324	13
$C_4H_3^+$	$CH_3C{\equiv}CCH_3$	H_2+H	15.1 ± 0.2	VC	331	13
$C_4H_3^+$	$CH{\equiv}CCH{=}CHCH{=}CH_2$		18.27	EVD		1197
$C_4H_3^+$	$C_2H_5C{\equiv}CC{\equiv}CH$		15.50	EVD		1197
$C_4H_3^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$		15.70	EVD		1197
$C_4H_3^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$		15.04	EVD		1197
$C_4H_3^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$		15.45	EVD		1197
$C_4H_3^+$ (Benzene)	C_6H_6		18.4	EVD		1197
$C_4H_3^+$ (Cubane)	C_8H_8		16.74 ± 0.21	EVD		2105
$C_4H_3^+$ (Pyridine)	C_5H_5N	$HCN+H$	16.61 ± 0.10	EVD	332	1406
$C_4H_3^+$ (Orthodiazine)	$C_4H_4N_2$	N_2+H	13.84 ± 0.10	EVD	334	1406
$C_4H_4^+$ Heat of formation 294 kcal mol^{-1}						
$C_4H_4^+$	$CH_2{=}C{=}C{=}CH_2$		9.28	TC		136
$C_4H_4^+$	$CH_2{=}C{=}C{=}CH_2$		9.64	TC		136
$C_4H_4^+$	$CH_2{=}CHC{\equiv}CH$		9.87	SL	297*	411
$C_4H_4^+$	$CH_2{=}CHC{\equiv}CH$		9.49	TC	288	136
$C_4H_4^+$	$C_2H_5C{\equiv}CH$	H_2	10.9 ± 0.2	VC	291*	13
$C_4H_4^+$	$CH_3C{\equiv}CCH_3$	H_2	14.0 ± 0.1	VC	358	13
$C_4H_4^+$	$C{\equiv}CCH{=}CHCH{=}CH_2$	C_2H_2	14.77	EVD	375	1197
$C_4H_4^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	C_2H_2	12	EVD	317	1197
$C_4H_4^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$	C_2H_2	11.82	EVD	312	1197
$C_4H_4^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	C_2H_2	12.12	EVD	315	1197
$C_4H_4^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	C_2H_2	11.4	EVD	308	1197
$C_4H_4^+$ (Benzene)	C_6H_6	C_2H_2	14.95 ± 0.05	EVD	310	1238
$C_4H_4^+$ (Benzene)	C_6H_6	C_2H_2	15.55	EVD	324	1197
$C_4H_4^+$ (Benzene)	C_6H_6	C_2H_2	15.55 ± 0.1	SL	324	2103
$C_4H_4^+$ (Cubane)	C_8H_8	$2C_2H_2$	13.78 ± 0.08	EVD	356	2105
$C_4H_4^+$ (Azulene)	$C_{10}H_8$		17.8 ± 0.10	SL		2112
$C_4H_4^+$ (Naphthalene)	$C_{10}H_8$		19.6 ± 0.20	SL		2112
$C_4H_4^+$ (Pyridine)	C_5H_5N	HCN	13.60 ± 0.10	EVD	315	1406
$C_4H_4^+$ (Orthodiazine)	$C_4H_4N_2$	N_2	11.64 ± 0.05	EVD	335	1406
$C_4H_4^+$ (Fluorobenzene)	C_6H_5F	C_2HF	17.00 ± 0.1	SL	(b)	2103
$C_4H_4^+$ (Chlorobenzene)	C_6H_5Cl	C_2HCl	17.57 ± 0.1	SL	(b)	2103
$C_4H_4^+$ (Bromobenzene)	C_6H_5Br	C_2HBr	16.77 ± 0.1	SL	(b)	2103

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_5^+$ Heat of formation 237 kcal mol^{-1}						
$C_4H_5^+$	$CH_3CHC{\equiv}CH$		7.88	TC	249	136
$C_4H_5^+$	$CH_2{=}CHCH{=}CH_2$	H	11.39 ± 0.05	PI	237*	2013
$C_4H_5^+$	$C_2H_5C{\equiv}CH$	H	11.6 ± 0.1	VC	255	13
$C_4H_5^+$	$CH_3C{\equiv}CCH_3$	H	12.2 ± 0.1	VC	264	13
$CH_3CH{=}C{=}CH_2^+$ Heat of formation 259 kcal mol^{-1}						
$CH_2{=}CHCH{=}CH_2^+$ 236 kcal mol^{-1}						
$C_2H_5C{\equiv}CH^+$ 274 kcal mol^{-1}						
$CH_3C{\equiv}CCH_3^+$ 263 kcal mol^{-1}						
$C_4H_6^+$	$CH_3CH{=}C{=}CH_2$		9.57 ± 0.02	SL	259*	462
$C_4H_6^+$	$CH_3CH{=}C{=}CH_2$		9.53	TC	259	136
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		9.07 ± 0.01	PI	236*	182, 416
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		9.075 ± 0.05	PI	236*	2013
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		9.08	PE	236*	1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		11.25	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		12.14	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		13.23	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		15.14	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		18.78	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		20.57	PE		1130
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		8.80 ± 0.02	RPD	229	224
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		9.1 ± 0.1	RPD		224
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		10.4 ± 0.1	RPD		224
$C_4H_6^+$	$CH_2{=}CHCH{=}CH_2$		9.18 ± 0.02	SL	238	462
$C_4H_6^+$	$C_2H_5C{\equiv}CH$		10.18 ± 0.01	PI	274*	162, 182, 416, 22
$C_4H_6^+$	$C_2H_5C{\equiv}CH$		10.2 ± 0.1	VC	275	13
$C_4H_6^+$	$CH_3C{\equiv}CCH_3$		9.9 ± 0.1	VC	263*	13
$C_4H_6^+$	$CH_3C{\equiv}CCH_3$		9.69	TC	258	136
$C_4H_6^+$ (Tetrahydrothiophene)	$(CH_2)_4S$	H_2S	11.9 ± 0.2	EVD	271	52
***n*-$C_4H_7^+$ Heat of formation 203 kcal mol^{-1}**						
***cyclo*-$C_4H_7^+$ 213 kcal mol^{-1}**						
***cyclo*-$C_3H_4CH_3^+$ 221 kcal mol^{-1}**						
$C_4H_7^+$	$CH_3CH{=}CHCH_2$		7.71 ± 0.05	EVD	(a)	108
$C_4H_7^+$	$CH_3CH{=}CHCH_2$		7.75	TC	205	136
$C_4H_7^+$	$CH_2{=}C(CH_3)CH_2$		8.03 ± 0.05	EVD	(a)	108
$C_4H_7^+$	$CH_2{=}C(CH_3)CH_2$		8.01	VC	206	108
$C_4H_7^+$	$CH_2{=}C(CH_3)CH_2$		8.04	TC	206	136
$C_4H_7^+$ (Cyclobutyl radical)	C_4H_7		7.88 ± 0.05	SL	(a)	123
$C_4H_7^+$ (Cyclobutyl radical)	C_4H_7		7.93	TC		2184
$C_4H_7^+$	1−C_4H_8	H	11.07 ± 0.1		203*	2114
$C_4H_7^+$	1−C_4H_8	H	12.01	LE	225	194, 195
$C_4H_7^+$	cis-2-C_4H_8	H	11.20	LE	205	194, 195
$C_4H_7^+$ (Cyclobutane)	C_4H_8	H	11.24	SL	213*	123
$C_4H_7^+$ (1,1-Dimethylcyclopropane)	C_5H_{10}	CH_3	11.38 ± 0.02	EVD	221*	1146

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_7^+$	C_5H_{10} (*cis*—1,2-Dimethylcyclopropane)	CH_3	11.35 ± 0.05	EVD	220*	1146
$C_4H_7^+$	C_5H_{10} (*trans*-1,2-Dimethylcyclopropane)	CH_3	11.41 ± 0.04	EVD	222*	1146
$C_4H_7^+$	n—C_7H_{16}	n—$C_3H_7 + H_2$?	11.5 ± 0.1	PI	198	2013
$C_4H_7^+$	n—$C_5H_{11}F$	$CH_3 + HF$?	11.42	SL	220	2029
$C_4H_7^+$	$(CH_2)_4S$ (Tetrahydrothiophene)	SH	12.4 ± 0.2	EVD	244	52
$C_4H_7^+$	$CH_3CH{=}CHCH_2I$	I	9.15 ± 0.05	EVD	200*	108
$C_4H_7^+$	$CH_2{=}C(CH_3)CH_2I$	I	9.40 ± 0.05	EVD	205*	108
		1-$C_4H_8^+$ Heat of formation 221 kcal mol^{-1}				
		***cis*-2-$C_4H_8^+$ 209 kcal mol^{-1}**				
		***trans*-2-$C_4H_8^+$ 208 kcal mol^{-1}**				
		***iso*-$C_4H_8^+$ 209 kcal mol^{-1}**				
		***cyclo*-$C_4H_8^+$ 250 kcal mol^{-1}**				
$C_4H_8^+$	1-C_4H_8		9.58 ± 0.01	PI	221*	182, 416
$C_4H_8^+$	1-C_4H_8		9.61 ± 0.02	PI	222*	1120
$C_4H_8^+$	1-C_4H_8		9.58	PI	221*	133
$C_4H_8^+$	1-C_4H_8		9.76	SL	225	62
$C_4H_8^+$	1-C_4H_8		9.72	LE	224	194, 195
$C_4H_8^+$	*cis*-2-C_4H_8		9.13 ± 0.01	PI	209*	182
$C_4H_8^+$	*cis*-2-C_4H_8		9.13 ± 0.02	PI	209*	168
$C_4H_8^+$	*cis*-2-C_4H_8		9.34	SL	214	62
$C_4H_8^+$	*cis*-2-C_4H_8		9.25	LE	212	194, 195
$C_4H_8^+$	*trans*-2-C_4H_8		9.13 ± 0.01	PI	208*	182
$C_4H_8^+$	*trans*-2-C_4H_8		9.13 ± 0.02	PI	208*	168
$C_4H_8^+$	*trans*-2-C_4H_8		9.27	SL	211	62
$C_4H_8^+$	2-C_4H_8		9.23	SL		411
$C_4H_8^+$	2-C_4H_8		9.33	TC		136
$C_4H_8^+$	*iso*-C_4H_8		9.23 ± 0.02	PI	209*	168
$C_4H_8^+$	*iso*-C_4H_8		9.23 ± 0.02	PI	209*	182
$C_4H_8^+$	*iso*-C_4H_8		9.26	SL	209	62
$C_4H_8^+$	*iso*-C_4H_8		9.44	TC	214	136
$C_4H_8^+$	C_4H_8 (Methylcyclopropane)		10.34	TC	245	473
$C_4H_8^+$	C_4H_8 (Cyclobutane)		10.58	SL	250*	123
$C_4H_8^+$	C_4H_8 (Cyclobutane)		10.05	TC	238	473
$C_4H_8^+$	C_4H_8 (Cyclobutane)		11.04	TC	261	136
$C_4H_8^+$	n-C_5H_{12}	CH_4	10.845 ± 0.005	PI	233	1120
$C_4H_8^+$	*iso*-C_5H_{12}	CH_4	10.685 ± 0.005	PI	227	1120
$C_4H_8^+$	*neo*-C_5H_{12}	CH_4	10.37 ± 0.01	PI	217	1120
$C_4H_8^+$	n-C_6H_{14}	C_2H_6	10.82 ± 0.005	PI	230	1120
$C_4H_8^+$	*iso*-C_6H_{14}	C_2H_6	10.54 ± 0.005	PI	222	1120
$C_4H_8^+$	$(C_2H_5)_2CHCH_3$	C_2H_6	10.495 ± 0.005	PI	221	1120
$C_4H_8^+$	$C_2H_5C(CH_3)_3$	C_2H_6	10.19 ± 0.05	PI	211	1120

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_8^+$	n-C_7H_{16}	C_3H_8?	10.87 ± 0.005	PI	231	1120
$C_4H_8^+$	n-C_7H_{16}	C_3H_8?	10.56 ± 0.05	PI	223	2013
$C_4H_8^+$	n-C_8H_{18}	n-C_4H_{10}	10.985 ± 0.02	PI	234	1120
$C_4H_8^+$	*tert*-$C_4H_9SiH_3$	SiH_4?	9.89 ± 0.05	SL		2182
$C_4H_8^+$	*tert*-$C_4H_9SiCl_3$	$HSiCl_3$?	10.26 ± 0.2	SL		2182
		***n*-$C_4H_9^+$ Heat of formation 218 kcal mol^{-1}**				
		***sec*-$C_4H_9^+$ 192 kcal mol^{-1}**				
		***iso*-$C_4H_9^+$ 205 kcal mol^{-1}**				
		***tert*-$C_4H_9^+$ 176 kcal mol^{-1}**				
$C_4H_9^+$	n-C_4H_9		8.64 ± 0.05	SL	218*	141, 145
$C_4H_9^+$	n-C_4H_9		8.0	TC	203	1439
$C_4H_9^+$	n-C_4H_9		8.47	TC	214	1006
$C_4H_9^+$	n-C_4H_9		8.60	TC	217	2038
$C_4H_9^+$	n-C_4H_9		8.64	TC	218	141, 145
$C_4H_9^+$	*sec*-C_4H_9		7.93 ± 0.05	SL	192*	141, 145
$C_4H_9^+$	*sec*-C_4H_9		7.6	TC	184	1439
$C_4H_9^+$	*sec*-C_4H_9		7.67	TC	186	1006
$C_4H_9^+$	*sec*-C_4H_9		7.87	TC	190	141, 145
$C_4H_9^+$	*sec*-C_4H_9		8.11	TC	196	2038
$C_4H_9^+$	*sec*-C_4H_9		8.22	TC	198	2038
$C_4H_9^+$	*iso*-C_4H_9		8.35 ± 0.05	SL	205*	141, 145
$C_4H_9^+$	*iso*-C_4H_9		7.8	TC	193	1439
$C_4H_9^+$	*iso*-C_4H_9		8.55	TC	210	141, 145
$C_4H_9^+$	*iso*-C_4H_9		8.57	TC	210	2038
$C_4H_9^+$	*tert*-C_4H_9		7.42 ± 0.07	SL	176*	141, 145
$C_4H_9^+$	*tert*-C_4H_9		6.94	TC	164	1006
$C_4H_9^+$	*tert*-C_4H_9		7.07	TC	168	136
$C_4H_9^+$	*tert*-C_4H_9		7.3	TC	173	1439
$C_4H_9^+$	*tert*-C_4H_9		7.32	TC	173	141, 145
$C_4H_9^+$	*tert*-C_4H_9		7.79	TC	184	2038
$C_4H_9^+$	*tert*-C_4H_9		7.97	TC	188	2038
$C_4H_9^+$	n-C_4H_{10}	H	11.11	LE	174	195
$C_4H_9^+$	*iso*-C_4H_{10}	H	11.6	LE	183	195
$C_4H_9^+$	n-C_5H_{12}	CH_3	10.955 ± 0.04	PI	184	1120
$C_4H_9^+$	n-C_5H_{12}	CH_3	11.095 ± 0.04	PI		1120
$C_4H_9^+$	*iso*-C_5H_{12}	CH_3	10.975 ± 0.04	PI	183	1120
$C_4H_9^+$	*iso*-C_5H_{12}	CH_3	11.325 ± 0.04	PI		1120
$C_4H_9^+$	*neo*-C_5H_{12}	CH_3	10.55 ± 0.005	PI	170	1120
$C_4H_9^+$	*neo*-C_5H_{12}	CH_3	10.83	VC	177	2101
$C_4H_8^+$	*tert*-$C_4H_9SiCl_3$	$HSiCl_3$?	10.26 ± 0.2	SL		2182
$C_4H_9^+$	n-C_6H_{14}	C_2H_5	10.86 ± 0.04	PI	185	1120
$C_4H_9^+$	n-C_6H_{14}	C_2H_5	11.115 ± 0.04	PI		1120
$C_4H_9^+$	*iso*-C_6H_{14}	C_2H_5	10.59 ± 0.005	PI	178	1120
$C_4H_9^+$	$(C_2H_5)_2CHCH_3$	C_2H_5	10.785 ± 0.04	PI	183	1120
$C_4H_9^+$	$(C_2H_5)_2CHCH_3$	C_2H_5	11.125 ± 0.04	PI		1120
$C_4H_9^+$	$C_2H_5C(CH_3)_3$	C_2H_5	10.495 ± 0.01	PI	173	1120
$C_4H_9^+$	n-C_7H_{16}	n-C_3H_7	10.95 ± 0.04	PI	186	1120
$C_4H_9^+$	n-C_7H_{16}	n-C_3H_7	10.56 ± 0.05	PI	177	2013
$C_4H_9^+$	n-C_8H_{18}	n-C_4H_9	11.19 ± 0.04	PI	190	1120

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2	10.6	RPD	201	2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2	11.6	RPD		2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2^-?	6.7	RPD		2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2^-?	7.9	RPD		2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2^-?	8.9	RPD		2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2^-?	9.5	RPD		2018
$C_4H_9^+$	*n*-C_4H_9ONO	NO_2^-?	9.9	RPD		2018
$C_4H_9^+$	*tert*-$C_4H_9SiH_3$	SiH_3	10.25 ± 0.02	SL		2182
$C_4H_9^+$	*tert*-$C_4H_9SiCl_3$	$SiCl_3$	10.72 ± 0.1	SL		2182
$C_4H_9^+$	$(n\text{-}C_4H_9)_2Hg$	*n*-C_4H_9Hg	10.55 ± 0.1	SL	(b)	506
	n-$C_4H_{10}^+$ Heat of formation 215 kcal mol^{-1}					
	iso-$C_4H_{10}^+$ 212 kcal mol^{-1}					
$C_4H_{10}^+$	*n*-C_4H_{10}		10.63 ± 0.03	PI	215*	416, 182
$C_4H_{10}^+$	*n*-C_4H_{10}		10.50	PE	212	1130
$C_4H_{10}^+$	*n*-C_4H_{10}		12.36	PE		1130
$C_4H_{10}^+$	*n*-C_4H_{10}		14.13	PE		1130
$C_4H_{10}^+$	*n*-C_4H_{10}		15.69	PE		1130
$C_4H_{10}^+$	*n*-C_4H_{10}		19.96	PE		1130
$C_4H_{10}^+$	*n*-C_4H_{10}		10.23	LE	206	195
$C_4H_{10}^+$	*n*-C_4H_{10}		10.66	TC	216	2038
$C_4H_{10}^+$	*n*-C_4H_{10}		10.68	TC	216	2038
$C_4H_{10}^+$	*n*-C_4H_{10}		10.71	TC	217	136
$C_4H_{10}^+$	*n*-C_4H_{10}		10.77	TC	218	473
$C_4H_{10}^+$	*n*-C_4H_{10}		10.81	TC	219	1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		11.56	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		11.71	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		12.24	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		12.64	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		16.21	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		18.64	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		22.98	TC		1352, 2020
$C_4H_{10}^+$	*n*-C_4H_{10}		27.23	TC		1352, 2020
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.57	PI	212*	182
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.78	PE	216	1130
$C_4H_{10}^+$	*iso*-C_4H_{10}		12.54	PE		1130
$C_4H_{10}^+$	*iso*-C_4H_{10}		14.51	PE		1130
$C_4H_{10}^+$	*iso*-C_4H_{10}		18.63	PE		1130
$C_4H_{10}^+$	*iso*-C_4H_{10}		19.86	PE		1130
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.79	SL	217	62
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.23	LE	204	195
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.79	TC	217	136
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.94	TC	220	1352, 2020
$C_4H_{10}^+$	*iso*-C_4H_{10}		10.98	TC	221	2038
$C_4H_{10}^+$	*iso*-C_4H_{10}		11.00	TC	222	2038
	$C_5H_3^+$					
$C_5H_3^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	CH_3	13.55	EVD	368	1197
$C_5H_3^+$ (Cubane)	C_8H_8		14.59 ± 0.24	EVD		2105

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_5^+$				
$C_5H_5^+$	C_5H_5		8.69 ± 0.1	SL		68
(Cyclopentadienyl radical)						
$C_5H_5^+$	C_5H_5		8.82	TC		136
(Cyclopentadienyl radical)						
$C_5H_5^+$	C_5H_6	H	12.6	SL	270	68
(Cyclopentadiene)						
$C_5H_5^+$	C_5H_6	H	11.9 ± 0.5	MSD	254	1451
(Cyclopentadiene)						
$C_5H_5^+$	C_7H_8	$C_2H_2 + H$	16.0	SL	306	219
(Cycloheptatriene)						
$C_5H_5^+$	C_7H_8	$C_2H_2 + H$	14.89	SL	299	219
(Bicyclo(3 · 2 · 0)heptadiene-2,6)						
		***cyclo*-$C_5H_6^+$ Heat of formation 239 kcal mol^{-1}**				
$C_5H_6^+$	C_5H_6		8.93 ± 0.05	SL	238*	2163
(Cyclopentadiene)						
$C_5H_6^+$	C_5H_6		9.00 ± 0.1	SL	239*	68
(Cyclopentadiene)						
$C_5H_6^+$	C_5H_6		8.91	TC	237	136
(Cyclopentadiene)						
$C_5H_6^+$	C_7H_8	C_2H_2	10.45	SL	249	219
(Bicyclo(3·2·0)heptadiene-2,6)						
$C_5H_6^+$	C_7H_8	C_2H_2	10.02	VC	239	219
(Bicyclo(3·2·0)heptadiene-2,6)						
$C_5H_6^+$	C_7H_{10}	C_2H_4	10.70	SL	256	219
(Cycloheptadiene)						
$C_5H_6^+$	C_7H_{10}	C_2H_4	9.58 ± 0.15	SL	(a)	2155
(Norbornene)						
$C_5H_6^+$	C_7H_{10}	C_2H_4	10.15	SL	252	219
(Bicyclo(3·2·0)heptene-6)						
$C_5H_6^+$	$C_6H_5NH_2$	HCN	12.3 ± 0.1	PI	276	1160
(Aniline)						
$C_5H_6^+$	C_7H_9Cl	C_2H_3Cl	9.75 ± 0.15	SL	(a)	2155
(Endo-5-chloro-2-norbornene)						
$C_5H_6^+$	C_7H_9Cl	C_2H_3Cl	9.77 ± 0.15	SL	(a)	2155
(Exo-5-chloro-2-norbornene)						
$C_5H_6^+$	C_7H_9Cl	C_2H_3Cl	10.15 ± 0.15	SL	(a)	2155
(3-chloronortricyclene)						
		$C_5H_5D^+$				
$C_5H_5D^+$	C_6H_5SD	CS	11.9 ± 0.2	SL		1039
(Deuterated benzenethiol)						
		$C_5H_7^+$				
$C_5H_7^+$	C_9H_{16}		12.21 ± 0.05	EVD		1184, 2028
(*cis*-Hexahydroindane)						
$C_5H_7^+$	C_9H_{16}		12.19 ± 0.03	EVD		1184, 2028
(*trans*-Hexahydroindane)						

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	$C_2H_5CH{=}C{=}CH_2^+$ Heat of formation 252 kcal mol^{-1}					
	$CH_3CH{=}CHCH{=}CH_2^+$ 219 kcal mol^{-1}					
	$CH_3CH{=}C{=}CHCH_3^+$ 247 kcal mol^{-1}					
	$CH_2{=}CHCH_2CH{=}CH_2^+$ 246 kcal mol^{-1}					
	$CH_2{=}CHC(CH_3){=}CH_2^+$ 235 kcal mol^{-1}					
	***cyclo*-$C_5H_8^+$ 216 kcal mol^{-1}**					
$C_5H_8^+$	$C_2H_5CH{=}C{=}CH_2$		9.42	SL	252*	62
$C_5H_8^+$	$CH_3CH{=}CHCH{=}CH_2$		8.68	SL	219*	62
$C_5H_8^+$	$CH_3CH{=}CHCH{=}CH_2$		8.84	TC	223	136
$C_5H_8^+$	$CH_3CH{=}C{=}CHCH_3$		9.26	SL	247*	62
$C_5H_8^+$	$CH_2{=}CHCH_2CH{=}CH_2$		9.58	SL	246*	62
$C_5H_8^+$	$CH_2{=}CHCH_2CH{=}CH_2$		8.94	TC	231	136
$C_5H_8^+$	$CH_2{=}C{=}C(CH_3)_2$		9.02	TC	239	136
$C_5H_8^+$	$CH_2{=}CHC(CH_3){=}CH_2$		8.845 ± 0.005	PI	235*	182
$C_5H_8^+$	$CH_2{=}CHC(CH_3){=}CH_2$		8.96	TC	237	136
$C_5H_8^+$ (Cyclopentene)	C_5H_8		9.01 ± 0.01	PI	216*	182
$C_5H_8^+$ (Cyclopentene)	C_5H_8		9.09	SL	217	411
$C_5H_8^+$ (Cyclopentene)	C_5H_8		9.27	SL	222	62
$C_5H_8^+$ (Fluorocyclopentane)	C_5H_9F	HF	10.56	SL	247	2029
$C_5H_8^+$ (Chlorocyclopentane)	C_5H_9Cl	HCl	10.53	SL	239	2029
	***cyclo*-$C_5H_9^+$ Heat of formation 194 kcal mol^{-1}**					
$C_5H_9^+$	$CH_3CH{=}CHCHCH_3$		7.34	TC	182	136
$C_5H_9^+$	$(CH_3)_2C{=}CHCH_2$		7.34	TC	184	136
$C_5H_9^+$ (Cyclopentyl radical)	C_5H_9		7.79 ± 0.03	SL	(a)	123
$C_5H_9^+$ (Cyclopentyl radical)	C_5H_9		7.83	TC		2184
$C_5H_9^+$ (Methylcyclopentane)	C_6H_{12}	CH_3	10.95	SL	194*	123
$C_5H_9^+$ (*cis*-1,2-Dimethylcyclohexane)	C_8H_{16}	n-C_3H_7?	12.12 ± 0.05	EVD	216	1145
$C_5H_9^+$ (*trans*-1,2-Dimethylcyclohexane)	C_8H_{16}	n-C_3H_7?	12.00 ± 0.05	EVD	212	1145

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		1-$C_5H_{10}^+$ Heat of formation	**214 kcal mol^{-1}**			
		***cis*-2-$C_5H_{10}^+$**	**203 kcal mol^{-1}**			
		***trans*-2-$C_5H_{10}^+$**	**201 kcal mol^{-1}**			
		$(CH_3)_2CHCH{=}CH^+$	**212 kcal mol^{-1}**			
		$C_2H_5C(CH_3){=}CH_2^+$	**202 kcal mol^{-1}**			
		$(CH_3)_2C{=}CHCH_3^+$	**189 kcal mol^{-1}**			
		***cyclo*-$C_3H_4(CH_3)_2^+$**	**225 kcal mol^{-1}**			
		***cyclo*-$C_5H_{10}^+$**	**224 kcal mol^{-1}**			
$C_5H_{10}^+$	1-C_5H_{10}		9.50 ± 0.02	PI	214*	182, 1120
$C_5H_{10}^+$	1-C_5H_{10}		9.67	SL	218	62
$C_5H_{10}^+$	*cis*-2-C_5H_{10}		9.11	SL	203*	62
$C_5H_{10}^+$	*trans*-2-C_5H_{10}		9.06	SL	201*	62
$C_5H_{10}^+$	$(CH_3)_2CHCH{=}CH_2$		9.51 ± 0.03	PI	212*	182
$C_5H_{10}^+$	$(CH_3)_2CHCH{=}CH_2$		9.60	SL	214	62
$C_5H_{10}^+$	$C_2H_5C(CH_3){=}CH_2$		9.12 ± 0.02	PI	202*	182
$C_5H_{10}^+$	$C_2H_5C(CH_3){=}CH_2$		9.20	SL	204	62
$C_5H_{10}^+$	$(CH_3)_2C{=}CHCH_3$		8.67 ± 0.02	PI	189*	182
$C_5H_{10}^+$	$(CH_3)_2C{=}CHCH_3$		8.68	PI	190*	168
$C_5H_{10}^+$	$(CH_3)_2C{=}CHCH_3$		8.89	SL	194	62
$C_5H_{10}^+$	$(CH_3)_2C{=}CHCH_3$		8.86	TC	194	136
$C_5H_{10}^+$ (1,1-Dimethylcyclopropane-)	C_5H_{10}		9.78 ± 0.02	EVD	225*	1146
$C_5H_{10}^+$ (cis-1,2-Dimethylcyclopropane)	C_5H_{10}		9.76 ± 0.02	EVD	225*	1146
$C_5H_{10}^+$ (trans-1,2-Dimethylcyclopropane)	C_5H_{10}		9.77 ± 0.02	EVD	225*	1146
$C_5H_{10}^+$ (Cyclopentane)	C_5H_{10}		10.53 ± 0.05	PI	224*	182
$C_5H_{10}^+$ (Cyclopentane)	C_5H_{10}		10.92	SL	233	123
$C_5H_{10}^+$ (Cyclopentane)	C_5H_{10}		10.53	TC	224	1352, 2020
$C_5H_{10}^+$ (Cyclopentane)	C_5H_{10}		10.64	TC	227	473
$c_5H_{10}^+$ (Cyclopentane)	C_5H_{10}		10.89	TC	233	136
$C_5H_{10}^+$	*n*-C_6H_{14}	CH_4	10.855 ± 0.03	PI	228	1120
$C_5H_{10}^+$	*iso*-C_6H_{14}	CH_4	10.67 ± 0.015	PI	222	1120
$C_5H_{10}^+$	$(C_2H_5)_2CHCH_3$	CH_4	10.63 ± 0.03	PI	222	1120
$C_5H_{10}^+$	$C_2H_5C(CH_3)_3$	CH_4	10.265 ± 0.01	PI	210	1120
$C_5H_{10}^+$	$(CH_3)_2CHCH(CH_3)_2$	CH_4	10.47 ± 0.02	PI	217	1120
$C_5H_{10}^+$	*n*-C_7H_{16}	C_2H_6	10.81 ± 0.01	PI	225	1120
$C_5H_{10}^+$	*n*-C_7H_{16}	C_2H_6	10.40 ± 0.05	PI	215	2013
$C_5H_{10}^+$ (*cis*-1,2-Dimethylcyclohexane)	C_8H_{16}	C_3H_6	11.62 ± 0.08	EVD	216	1145
$C_5H_{10}^+$ (*trans*-1,2-Dimethylcyclohexane)	C_8H_{16}	C_3H_6	11.60 ± 0.07	EVD	212	1145
$C_5H_{10}^+$	*n*-C_8H_{18}	C_3H_8	10.90 ± 0.015	PI	226	1120
$C_5H_{10}^+$	*n*-$C_5H_{11}F$	HF	10.07	SL	222	2029
$C_5H_{10}^+$	*n*-$C_5H_{11}Cl$	HCl	10.63	SL	227	2029

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		***n*-$C_5H_{11}^+$ Heat of formation 171 kcal mol^{-1}**				
		$C_2H_5CH_2\dot{C}HCH_3^+$ 173 kcal mol^{-1}				
		$(C_2H_5)_2\dot{C}H^+$ 174 kcal mol^{-1}				
		$CH(CH_3)_2\dot{C}HCH_3^+$ 168 kcal mol^{-1}				
		***tert*-$C_5H_{11}^+$ 164 kcal mol^{-1}**				
		***neo*-$C_5H_{11}^+$ 196 kcal mol^{-1}**				
$C_5H_{11}^+$	*n*-C_5H_{11}		7.7	TC	187	1439
$C_5H_{11}^+$	*n*-C_5H_{11}		8.49	TC	205	1006
$C_5H_{11}^+$	*n*-C_5H_{11}		8.60	TC	207	2038
$C_5H_{11}^+$	*n*-$C_3H_7CHCH_3$		7.73 ± 0.1	EVD	(a)	151
$C_5H_{11}^+$	*n*-$C_3H_7CHCH_3$		7.66	TC	182	1006
$C_5H_{11}^+$	*n*-$C_3H_7CHCH_3$		8.11	TC	193	2038
$C_5H_{11}^+$	*n*-$C_3H_7CHCH_3$		8.22	TC	196	2038
$C_5H_{11}^+$	$(C_2H_5)_2CH$		7.86 ± 0.05	EVD	(a)	151
$C_5H_{11}^+$	$(C_2H_5)_2CH$		7.58	TC	179	1006
$C_5H_{11}^+$	$(C_2H_5)_2CH$		8.08	TC	190	2038
$C_5H_{11}^+$	$(C_2H_5)_2CH$		8.20	TC	193	2038
$C_5H_{11}^+$	*iso*-C_5H_{11}		8.60	TC	206	2038
$C_5H_{11}^+$	*iso*-$C_3H_7CHCH_3$		8.09	TC	189	2038
$C_5H_{11}^+$	*iso*-$C_3H_7CHCH_3$		8.20	TC	192	2038
$C_5H_{11}^+$	$C_2H_5CH(CH_3)CH_2$		8.56	TC	205	2038
$C_5H_{11}^+$	$C_2H_5CH(CH_3)CH_2$		8.57	TC	205	2038
$C_5H_{11}^+$	*tert*-C_5H_{11}		7.12 ± 0.1	EVD	(a)	151
$C_5H_{11}^+$	*tert*-C_5H_{11}		6.94	TC	161	1006
$C_5H_{11}^+$	*tert*-C_5H_{11}		7.77	TC	180	2038
$C_5H_{11}^+$	*tert*-C_5H_{11}		7.96	TC	185	2038
$C_5H_{11}^+$	*neo*-C_5H_{11}		8.33 ± 0.1	EVD	196*	151
$C_5H_{11}^+$	*neo*-C_5H_{11}		8.54	TC	201	2038
$C_5H_{11}^+$	*neo*-C_5H_{11}		8.55	TC	201	2038
$C_5H_{11}^+$	*n*-C_6H_{14}	CH_3	10.89 ± 0.05	PI	178	1120
$C_5H_{11}^+$	*iso*-C_6H_{14}	CH_3	10.735 ± 0.05	PI	173*	1120
$C_5H_{11}^+$	$(C_2H_5)_2CHCH_3$	CH_3	10.75 ± 0.05	PI	174*	1120
$C_5H_{11}^+$	$C_2H_5C(CH_3)_3$	CH_3	10.475 ± 0.03	PI	164*	1120
$C_5H_{11}^+$	$(CH_3)_2CHCH(CH_3)_2$	CH_3	10.58 ± 0.05	PI	168*	1120
$C_5H_{11}^+$	*n*-C_7H_{16}	C_2H_5	10.43 ± 0.05	PI	171*	2013
$C_5H_{11}^+$	*n*-C_7H_{16}	C_2H_5	10.80 ± 0.05	PI	179	1120
$C_5H_{11}^+$	*n*-C_8H_{18}	*n*-C_3H_7	11.045 ± 0.05	PI	183	1120

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		***n*-$C_5H_{12}^+$ Heat of formation 204 kcal mol^{-1}**				
		***iso*-$C_5H_{12}^+$ 201 kcal mol^{-1}**				
		***neo*-$C_5H_{12}^+$ 199 kcal mol^{-1}**				
$C_5H_{12}^+$	*n*-C_5H_{12}		10.35	PI	204*	182
$C_5H_{12}^+$	*n*-C_5H_{12}		10.25	TC	201	1439
$C_5H_{12}^+$	*n*-C_5H_{12}		10.49	TC	207	2038
$C_5H_{12}^+$	*n*-C_5H_{12}		10.51	TC	207	2038
$C_5H_{12}^+$	*n*-C_5H_{12}		10.54	TC	208	136
$C_5H_{12}^+$	*n*-C_5H_{12}		10.55	TC	208	473
$C_5H_{12}^+$	*n*-C_5H_{12}		10.56	TC	208	1006
$C_5H_{12}^+$	*n*-C_5H_{12}		10.58	TC	209	1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		11.31	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		11.64	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		11.71	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		12.24	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		12.64	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		15.97	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		17.70	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		20.79	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		24.68	TC		1352, 2020
$C_5H_{12}^+$	*n*-C_5H_{12}		27.76	TC		1352, 2020
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.32	PI	201*	182
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.60	SL	208	62
$C_5H_{12}^+$	*iso*-C_5H_{12}		9.96	TC	193	473
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.49	TC	205	1352, 2020
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.50	TC	205	136
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.61	TC	208	2038
$C_5H_{12}^+$	*iso*-C_5H_{12}		10.63	TC	208	2038
$C_5H_{12}^+$	*neo*-C_5H_{12}		10.35	PI	199*	182
$C_5H_{12}^+$	*neo*-C_5H_{12}		10.30	TC	198	473
$C_5H_{12}^+$	*neo*-C_5H_{12}		10.66	TC	206	1352, 2020
$C_5H_{12}^+$	*neo*-C_5H_{12}		10.67	TC	206	136
		C_6H^+				
C_6H^+ (Phenyl methyl sulfide)	$C_6H_5SCH_3$		14.4	SL		307
		$C_6H_2^+$				
$C_6H_2^+$ (EI on neutral fragment from benzene)	C_6H_2		9.8 ± 0.1	NS		87

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_3^+$ Heat of formation 453 kcal mol^{-1}						
$C_6H_3^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	H_2+H	17.92	EVD	455*	1197
$C_6H_3^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	H_2+H	17.99	EVD	452*	1197
$C_6H_3^+$ (Azulene)	$C_{10}H_8$		19.2 ± 0.15	SL		2112
$C_6H_3^+$ (Naphthalene)	$C_{10}H_8$		20.77 ± 0.01	SL		2112
$C_6H_3^+$ (*o*-Chlorofluorobenzene)	C_6H_4FCl		16.67	EVD		1185
$C_6H_3^+$ (*m*-Chlorofluorobenzene)	C_6H_4FCl		16.78	EVD		1185
$C_6H_3^+$ (*p*-Chlorofluorobenzene)	C_6H_4FCl		16.81	EVD		1185
$C_6H_4^+$ Heat of formation 352 kcal mol^{-1}						
$C_6H_4^+$ (Benzyne)	C_6H_4		9.75	NS	389	29
$C_6H_4^+$ (EI on neutral fragment from benzene)	C_6H_4		9.5 ± 0.1	NS	383	87
$C_6H_4^+$	$CH{\equiv}CCH{=}CHCH{=}CH_2$	H_2	13.72	EVD	405	1197
$C_6H_4^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	H_2	11.07	EVD	349*	1197
$C_6H_4^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$	H_2	11.02	EVD	348	1197
$C_6H_4^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	H_2	11.35	EVD	351*	1197
$C_6H_4^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	H_2	11.17	EVD	357*	1197
$C_6H_4^+$ (Benzene)	C_6H_6	H_2	14.59	EVD	356*	1197
$C_6H_4^+$ (Benzene)	C_6H_6	H_2	14.09 ± 0.07	SL	345*	1238
$C_6H_4^+$ (Benzene)	C_6H_6	H_2	14.59 ± 0.1	SL	356*	2103
$C_6H_4^+$ (Azulene)	$C_{10}H_8$		16.7 ± 0.15	SL		2112
$C_6H_4^+$ (Naphthalene)	$C_{10}H_8$		18.2 ± 0.15	SL		2112
$C_6H_4^+$ (Biphenyl)	$(C_6H_5)_2$	C_6H_5+H	18.05 ± 0.3	SL	332	1238
$C_6H_4^+$ (Fluorobenzene)	C_6H_5F	HF	15.37 ± 0.1	SL	393	2103
$C_6H_4^+$ (Chlorobenzene)	C_6H_5Cl	HCl	14.87 ± 0.2	SL	378	2103
$C_6H_4^+$ (Bromobenzene)	C_6H_5Br	HBr	14.20 ± 0.2	SL	360	2103
***cyclo*-$C_6H_5^+$ Heat of formation 285 kcal mol^{-1}**						
$C_6H_5^+$ (Phenyl radical)	C_6H_5		9.20	SL	284*	1079
$C_6H_5^+$ (EI on neutral fragment from triphenylstilbene)	C_6H_5		9.35 ± 0.1	NS	288	87
$C_6H_5^+$	$CH{\equiv}CCH{=}CHCH{=}CH_2$	H	13.52	EVD	348	1197
$C_6H_5^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	H	11.50	EVD	307	1197
$C_6H_5^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$	H	11.50	EVD	307	1197
$C_6H_5^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	H	11.57	EVD	304	1197
$C_6H_5^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	H	11.47	EVD	311	1197

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_5^+$ (Benzene)	C_6H_6	H	13.8 ± 0.1	PI	286*	2013
$C_6H_5^+$ (Benzene)	C_6H_6	H	14.37	EVD	299	1197
$C_6H_5^+$ (Benzene)	C_6H_6	H	14.44 ± 0.05	SL	301	1238
$C_6H_5^+$ (Benzene)	C_6H_6	H	14.37 ± 0.1	SL	299	2103
$C_6H_5^+$ (Toluene)	$C_6H_5CH_3$	CH_3	13.7 ± 0.1	SL	295	301
$C_6H_5^+$ (Norbornene)	C_7H_{10}	$CH_3 + H_2$	13.8 ± 0.3	LE	316	2155
$C_6H_5^+$ (Cubane)	C_8H_8	$C_2H_2 + H$	12.21 ± 0.10	EVD	324	2105
$C_6H_5^+$ (Azulene)	$C_{10}H_8$		16.9 ± 0.10	SL		2112
$C_6H_5^+$ (Naphthalene)	$C_{10}H_8$		18.45 ± 0.04	SL		2112
$C_6H_5^+$ (Biphenyl)	$(C_6H_5)_2$	C_6H_5	18.2 ± 0.5	SL	387	1238
$C_6H_5^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	C_8H_5?	20.7 ± 0.1	SL		1238
$C_6H_5^+$ (Benzaldehyde)	C_6H_5CHO	CO + H	14.54 ± 0.05	SL	299	1237
$C_6H_5^+$ (Benzaldehyde)	C_6H_5CHO	CO + H	14.0	SL	287	308
$C_6H_5^+$ (Benzaldehyde)	C_6H_5CHO	CHO	13.51 ± 0.12	NS	305	130
$C_6H_5^+$ (Phenoxyacetylene)	$C_6H_5OC{\equiv}CH$	OC_2H	12.2 ± 0.1	VC		13
$C_6H_5^+$ (Acetophenone)	$C_6H_5COCH_3$	$CO + CH_3$	14.23 ± 0.05	SL	299	1237
$C_6H_5^+$ (Acetophenone)	$C_6H_5COCH_3$	$CO + CH_3$	13.5	SL	282	308
$C_6H_5^+$ (Acetophenone)	$C_6H_5COCH_3$	$CO + CH_3$	13.42 ± 0.07	VC	280	2174
$C_6H_5^+$ (Benzyl methyl ketone)	$C_6H_5CH_2COCH_3$	$CH_2CO + CH_3$	13.66 ± 0.02	VC	269	2174
$C_6H_5^+$ (Phenyl ether)	$(C_6H_5)_2O$	C_6H_5O	14.85 ± 0.05	SL	350	1237
$C_6H_5^+$ (Benzophenone)	$(C_6H_5)_2CO$	$C_6H_5 + CO$?	16.22 ± 0.07	SL	341	1237
$C_6H_5^+$ (Phenyl benzoate)	$(C_6H_5)_2CO_2$	$C_6H_5O + CO$	15.46 ± 0.05	SL	344	1237
$C_6H_5^+$ (Benzil)	$(C_6H_5)_2C_2O_2$	$C_6H_5 + 2CO$?	15.12 ± 0.2	SL	308	1237
$C_6H_5^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$	$C_5H_5 + CO + CO_2$	12.1 ± 0.1	SL	(b)	1237
$C_6H_5^+$ (Benzamide)	$C_6H_5CONH_2$	$CO + NH_2$	13.5 ± 0.1	SL	269	1168
$C_6H_5^+$ (Diazoacetophenone)	$C_6H_5COCHN_2$	$CO + CHN_2$?	14.07 ± 0.14	VC		2174
$C_6H_5^+$ (Fluorobenzene)	C_6H_5F	F	15.47 ± 0.1	SL	311	2103
$C_6H_5^+$ (Fluorobenzene)	C_6H_5F	F	14.5 ± 0.1	SL	289	301
$C_6H_5^+$ (Benzotrifluoride)	$C_6H_5CF_3$	CF_3	15.2 ± 0.1	SL	326	301

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_5^+$ (Trifluoroacetophenone)	$C_6H_5COCF_3$	$CO + CF_3$	12.0	SL		308
$C_6H_5^+$ (Deuterated benzenethiol)	C_6H_5SD	SD	13.3 ± 0.2	SL		1039
$C_6H_5^+$ (Chlorobenzene)	C_6H_5Cl	Cl	13.2 ± 0.1	SL	288	301
$C_6H_5^+$ (Chlorobenzene)	C_6H_5Cl	Cl	13.57 ± 0.12	SL	297	2103
$C_6H_5^+$ (*endo*-5-Chloro-2-norbornene)	C_7H_9Cl	$CH_2Cl + H_2$	13.0 ± 0.3	LE	294	2155
$C_6H_5^+$ (*exo*-5-Chloro-2-norbornene)	C_7H_9Cl	$CH_2Cl + H_2$	13.0 ± 0.3	LE	294	2155
$C_6H_5^+$ (3-Chloronortricyclene)	C_7H_9Cl	$CH_2Cl + H_2$	12.7 ± 0.3	LE	279	2155
$C_6H_5^+$ (Bromobenzene)	C_6H_5Br	Br	12.62 ± 0.05	SL	288	2103
$C_6H_5^+$ (Bromobenzene)	C_6H_5Br	Br	12.6 ± 0.1	SL	288	301
$C_6H_5^+$ (Iodobenzene)	C_6H_5I	I	12.47 ± 0.05	SL	299	2103
$cyclo$-$C_6H_6^+$ Heat of formation 233 kcal mol^{-1}						
$C_6H_6^+$	$CH{\equiv}CCH{=}CHCH{=}CH_2$		9.50	EVD	307	1197
$C_6H_6^+$	$C_2H_5C{\equiv}CC{\equiv}CH$		9.25	EVD	307	1197
$C_6H_6^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$		9.75	EVD	319	1197
$C_6H_6^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$		9.20	EVD	301	1197
$C_6H_6^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$		10.35	EVD	338	1197
$C_6H_6^+$ (Benzene)	C_6H_6		9.247 ± 0.002	S	233*	422
$C_6H_6^+$ (Benzene)	C_6H_6		9.190 ± 0.005	S	232*	1114
$C_6H_6^+$ (Benzene)	C_6H_6		9.247	S	233*	423
$C_6^+{}_6$ (Benzene)	C_6H_6		9.248	S	233*	1115
$C_6H_6^+$ (Benzene)	C_6H_6		9.246 ± 0.005	PI	233*	2013
$C_6H_6^+$ (Benzene)	C_6H_6		9.241 ± 0.006	PI	233*	1253
$C_6H_6^+$ (Benzene)	C_6H_6		9.242 ± 0.01	PI	233*	54, 1118
$C_6H_6^+$ (Benzene)	C_6H_6		9.245 ± 0.01	PI	233*	182, 416
$C_6H_6^+$ (Benzene)	C_6H_6		9.24 ± 0.02	PI	233*	1142, 1166
$C_6H_6^+$ (Benzene)	C_6H_6		9.20 ± 0.05	PI	232*	1160
$C_6H_6^+$ (Benzene)	C_6H_6		9.25	PI	233*	1159
$C_6H_6^+$ (Benzene)	C_6H_6		9.25	PE	233*	1130
$C_6H_6^+$ (Benzene)	C_6H_6		9.39	PE	236	2015

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_6^+$ (Benzene)	C_6H_6		9.20 ± 0.1	RPD	232	2158
$C_6H_6^+$ (Benzene)	C_6H_6		9.40 ± 0.1	RPD		2158
$C_6H_6^+$ (Benzene)	C_6H_6		9.65 ± 0.1	RPD		2158
$C_6H_6^+$ (Benzene)	C_6H_6		9.24	EVD	233	1197
$C_6H_6^+$ 1132 (Benzene)	C_6H_6		9.14	SL	231	1132
C H_6^+ (Benzene)	C_6H_6		9.22 ± 0.05	SL	232	1238
$C_6H_6^+$ (Benzene)	C_6H_6		9.38	SL	236	413
$C_6H_6^+$ (Benzene)	C_6H_6		9.50	SL	239	1079
C_6H^+ (Benzene)	C_6H_6		9.56	SL	240	1066
$C_6H_6^+$ (Benzene)	C_6H_6		9.60 ± 0.05	SL	241	2163
C_6H^+ (Benzene)	C_6H_6		9.9 ± 0.1	SL	248	301
$C_6H_6^+$ (Benzene)	C_6H_6		9.46 ± 0.1	CS	238	381
$C_6H_6^+$ (Benzene)	C_6H_6		9.52 ± 0.10	CS	239	383
$C_6H_6^+$ (Benzene)	C_6H_6		9.7	EC	243	218
$C_6H_6^+$ (Benzene)	C_6H_6		9.37	TC	236	348
$C_6H_6^+$ (Benzene)	C_6H_6		9.53	TC	240	136
$C_6H_6^+$ (Benzene)	C_6H_6		10.35 ± 0.1	PI		1160
$C_6H_6^+$ (Benzene)	C_6H_6		10.75 ± 0.1	PE		1159
$C_6H_6^+$ (Benzene)	C_6H_6		11.489	S	285	1115
$C_6H_6^+$ (Benzene)	C_6H_6		11.7 ± 0.3	S	290	1114
$C_6H_6^+$ (Benzene)	C_6H_6		11.53	PI		54
$C_6H_6^+$ (Benzene)	C_6H_6		11.5 ± 0.1	PI		1160
$C_6H_6^+$ (Benzene)	C_6H_6		11.49	PE	285	1130
$C_6H_6^+$ (Benzene)	C_6H_6		11.91	PE		2015
$C_6H_6^+$ (Benzene)	C_6H_6		12.19	PE		1130
$C_6H_6^+$ (Benzene)	C_6H_6		13.67	PE		1130
$C_6H_6^+$ (Benzene)	C_6H_6		14.44	PE		1130

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_6^+$ (Benzene)	C_6H_6		16.84	S	408	1115
$C_6H_6^+$ (Benzene)	C_6H_6		16.73	PE		1130
$C_6H_6^+$ (Benzene)	C_6H_6		16.93	PE		2015
$C_6H_6^+$ (Benzene)	C_6H_6		18.75	PE		1130
$C_6H_6^+$ (Benzene)	C_6H_6		19.82	PE		1130
$C_6H_6^+$ (Fulvene)	C_6H_6		9.07	TC		136
$C_6H_6^+$ (Fulvene)	C_6H_6		9.38	TC		
$C_6H_6^+$ (Cubane)	C_8H_8	C_2H_2	9.15 ± 0.10	EVD	306	2105
$C_6H_6^+$ (Azulene)	$C_{10}H_8$	C_4H_2	13.86 ± 0.05	SL	(b)	2112
$C_6H_6^+$ (Naphthalene)	$C_{10}H_8$	C_4H_2	15.20 ± 0.05	SL	(b)	2112
$C_6H_6^+$ (Phenyl methyl sulfide)	$C_6H_5SCH_3$	CH_2S	12.0	SL	249	307
		$C_6H_5D^+$				
$C_6H_5D^+$ (Benzene-d_1)	C_6H_5D		9.44	SL		413
		$C_6H_5D^{+2}$				
$C_6H_5D^{+2}$ (Benzene-d_1)	C_6H_5D		26.0 ± 0.2	FDP		212
		$C_6H_5D^{+3}$				
$C_6H_5D^{+3}$ (Benzene-d_1)	C_6H_5D		44 ± 5	NRE		212
		$C_6D_6^+$				
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.251 ± 0.002	S		422
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.190 ± 0.005	S		1114
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.251	S		423
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.251	S		1115
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.245 ± 0.01	PI		54
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		9.245 ± 0.01	PI		1118
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		11.520	S		1115
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		11.59	PI		54
$C_6D_6^+$ (Benzene-d_6)	C_6D_6		16.87	S		1115

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_6H_7^+$				
$C_6H_7^+$	$C_5H_4CH_3$		8.54	SL		126
(Methylcyclopentadienyl radical)						
$C_6H_7^+$	C_7H_{10}	CH_3	11.2 ± 0.15	SL	256	2155
(Norbornene)						
$C_6H_7^+$	C_7H_9Cl	CH_2Cl	10.9 ± 0.15	SL	245	2155
(*endo*-5-Chloro-2-norbornene)						
$C_6H_7^+$	C_7H_9Cl	CH_2Cl	10.8 ± 0.15	SL	243	2155
(*exo*-5-Chloro-2-norbornene)						
$C_6H_7^+$	C_7H_9Cl	CH_2Cl	10.25 ± 0.15	SL	222	2155
(3-Chloronortricyclene)						
		***cyclo*-$C_5H_5CH_3^+$ Heat of formation 218 kcal mol^{-1}**				
$C_6H_8^+$	$CH_2{=}CHCH{=}CHCH{=}CH_2$		8.62	TC	248	136
$C_6H_8^+$	C_6H_8		8.43 ± 0.05	SL	218*	2163
(1-Methylcyclopentadiene)						
$C_6H_8^+$	C_6H_8		8.46 ± 0.05	SL	219*	2163
(2-Methylcyclopentadiene)						
		$C_6H_9^+$				
$C_6H_9^+$	C_9H_{16}	n-C_3H_7?	11.99 ± 0.05	EVD	220	1184, 2028
(*cis*-Hexahydroindane)						
$C_6H_9^+$	C_9H_{16}	n-C_3H_7?	12.07 ± 0.04	EVD	222	1184, 2028
(*trans*-Hexahydroindane)						
		***cyclo*-$C_6H_{10}^+$ Heat of formation 199 kcal mol^{-1}**				
$C_6H_{10}^+$	C_6H_{10}		8.945 ± 0.01	PI	204	182, 416
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		8.72	PE	199*	1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		10.29	PE		1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		10.98	PE		1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		12.47	PE		1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		16.25	PE		1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		18.48	PE		1130
(Cyclohexene)						
$C_6H_{10}^+$	C_6H_{10}		8.85 ± 0.09	SL	202	411
(Cyclohexene)						
$C_6H_{10}^+$	C_8H_{16}	C_2H_6	10.62 ± 0.04	EVD	224	1145
(*cis*-1,2-Dimethylcyclohexane)						
$C_6H_{10}^+$	C_8H_{16}	C_2H_6	10.87 ± 0.08	EVD	228	1145
(*trans*-1,2-Dimethylcyclohexane)						
$C_6H_{10}^+$	C_9H_{16}	C_3H_6?	10.79 ± 0.03	EVD	210	1184, 2028
(*cis*-Hexahydroindane)						
$C_6H_{10}^+$	C_9H_{16}	C_3H_6?	11.00 ± 0.02	EVD	215	1184, 2028
(*trans*-Hexahydroindane)						
$C_6H_{10}^+$	$C_{10}H_{18}$	*cis*-C_4H_8?	10.89 ± 0.02	EVD	212	1182, 1183
(*cis*-Decaline)						
$C_6H_{10}^+$	$C_{10}H_{18}$	*trans*-C_4H_8?	11.29 ± 0.02	EVD	220	1182, 1183
(*trans*-Decaline)						

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$cyclo$-$C_6H_{11}^+$ Heat of formation 185 kcal mol^{-1}						
$C_6H_{11}^+$	C_6H_{11}		7.66 ± 0.05	SL	(a)	123
(Cyclohexyl radical)						
$C_6H_{11}^+$	C_6H_{11}		7.75	TC		2184
(Cyclohexyl radical)						
$C_6H_{11}^+$	C_6H_{12}	H	11.66	SL	187*	123
(Cyclohexane)						
$C_6H_{11}^+$	C_7H_{14}	CH_3	10.95	SL	183*	123
(Methylcyclohexane)						
$C_6H_{11}^+$	C_8H_{16}	C_2H_5	11.06 ± 0.02	EVD	189	1145
(*cis*-1,2-Dimethylcyclohexane)						
$C_6H_{11}^+$	C_8H_{16}	C_2H_5	11.27 ± 0.02	EVD	192	1145
(*trans*-1,2-Dimethylcyclohexane)						
1-$C_6H_{12}^+$ Heat of formation 208 kcal mol^{-1}						
$(CH_3)_2C{=}C(CH_3)_2^+$ 175 kcal mol^{-1}						
$cyclo$-$C_6H_{12}^+$ 197 kcal mol^{-1}						
$C_6H_{12}^+$	1-C_6H_{12}		9.45 ± 0.02	PI	208*	1120
$C_6H_{12}^+$	1-C_6H_{12}		9.46 ± 0.02	PI	208*	182
$C_6H_{12}^+$	*trans*-2-C_6H_{12}		9.16		198	2114
$C_6H_{12}^+$	*trans*-3-C_6H_{12}		9.12		197	2114
$C_6H_{12}^+$	$(C_2H_5)_2C{=}CH_2$		9.21		199	2114
$C_6H_{12}^+$	$(CH_3)_2C{=}C(CH_3)_2$		8.30	PI	175*	168
$C_6H_{12}^+$	$(CH_3)_2C{=}C(CH_3)_2$		8.40	TC	178	136
$C_6H_{12}^+$	C_6H_{12}		10.45	SL	216	123
(Methylcyclopentane)						
$C_6H_{12}^+$	C_6H_{12}		10.28	TC	212	1352, 2020
(Methylcyclopentane)						
$C_6H_{12}^+$	C_6H_{12}		9.88 ± 0.02	PI	198*	182, 416
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		9.79	PE	196*	1130
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		11.33	PE		1130
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		12.22	PE		1130
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		14.37	PE		1130
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		19.43	PE		1130
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		10.50	SL	213	123
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		10.05	TC	202	473
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		10.06	TC	203	1352, 2020
(Cyclohexane)						
$C_6H_{12}^+$	C_6H_{12}		10.79	TC	219	136
(Cyclohexane)						
$C_6H_{12}^+$	n-C_7H_{16}	CH_4	10.875 ± 0.02	PI	224	1120
$C_6H_{12}^+$	C_8H_{16}	C_2H_4	11.17 ± 0.02	EVD	204	1145
(*cis*-1,2-Dimethylcyclohexane)						
$C_6H_{12}^+$	C_8H_{16}	C_2H_4	11.25 ± 0.04	EVD	204	1145
(*trans*-1,2-Dimethylcyclohexane)						
$C_6H_{12}^+$	n-C_8H_{18}	C_2H_6	10.62 ± 0.01	PI	215	1120

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		n-$C_6H_{13}^+$ Heat of formation 170 kcal mol^{-1}				
$C_6H_{13}^+$	n-C_7H_{16}	CH_3	10.79 ± 0.06	PI	171*	1120
$C_6H_{13}^+$	n-C_7H_{16}	CH_3	10.7 ± 0.1	PI	169*	2013
$C_6H_{13}^+$	n-C_8H_{18}	C_2H_5	10.705 ± 0.01	PI	172	1120
		n-$C_6H_{14}^+$ Heat of formation 195 kcal mol^{-1}				
		***iso*-$C_6H_{14}^+$ 192 kcal mol^{-1}**				
		$(C_2H_5)_2CHCH_3^+$ 191 kcal mol^{-1}				
		$C_2H_5C(CH_3)_2^+$ 188 kcal mol^{-1}				
		$(CH_3)_2CHCH(CH_3)_2^+$ 189 kcal mol^{-1}				
$C_6H_{14}^+$	n-C_6H_{14}		10.18	PI	195*	182
$C_6H_{14}^+$	n-C_6H_{14}		10.12	TC	193	1439
$C_6H_{14}^+$	n-C_6H_{14}		10.15	TC	194	1439
$C_6H_{14}^+$	n-C_6H_{14}		10.40	TC	200	2038
$C_6H_{14}^+$	n-C_6H_{14}		10.41	TC	200	473
$C_6H_{14}^+$	n-C_6H_{14}		10.41	TC	200	2038
$C_6H_{14}^+$	n-C_6H_{14}		10.42	TC	200	1006
$C_6H_{14}^+$	n-C_6H_{14}		10.46	TC	201	136
$C_6H_{14}^+$	n-C_6H_{14}		10.43	TC	201	1352
$C_6H_{14}^+$	n-C_6H_{14}		11.09	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		11.50	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		11.67	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		11.70	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		12.24	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		12.64	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		15.83	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		17.13	TC		1352, 2020
$C_2H_{14}^+$	n-C_6H_{14}		19.40	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		22.57	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		25.77	TC		1352, 2020
$C_6H_{14}^+$	n-C_6H_{14}		28.07	TC		1352, 2020
$C_6H_{14}^+$	*iso*-C_6H_{14}		10.12	PI	192*	182
$C_6H_{14}^+$	*iso*-C_6H_{14}		10.32	TC	196	1352, 2020
$C_6H_{14}^+$	*iso*-C_6H_{14}		10.41	TC	198	136
$C_6H_{14}^+$	*iso*-C_6H_{14}		10.45	TC	199	2038
$C_6H_{14}^+$	*iso*-C_6H_{14}		10.46	TC	199	2038
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		10.08	PI	191*	182
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		9.81	TC	185	473
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		10.31	TC	197	1352, 2020
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		10.46	TC	200	136
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		10.49	TC	201	2038
$C_6H_{14}^+$	$(C_2H_5)_2CHCH_3$		10.51	TC	201	2038
$C_6H_{14}^+$	$C_2H_5C(CH_3)_3$		10.06	PI	188*	182
$C_6H_{14}^+$	$C_2H_5C(CH_3)_3$		9.93	TC	185	473
$C_6H_{14}^+$	$C_2H_5C(CH_3)_3$		10.18	TC	190	1352, 2020
$C_6H_{14}^+$	$(CH_3)_2CHCH(CH_3)_2$		10.02	PI	189*	182
$C_6H_{14}^+$	$(CH_3)_2CHCH(CH_3)_2$		10.13	TC	191	1352, 2020
$C_6H_{14}^+$	$(CH_3)_2CHCH(CH_3)_2$		10.54	TC	201	2038
$C_6H_{14}^+$	$(CH_3)_2CHCH(CH_3)_2$		10.55	TC	201	136
$C_6H_{14}^+$	$(CH_3)_2CHCH(CH_3)_2$		10.56	TC	201	2038

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_5^+$				
$C_7H_5^+$ (Biphenyl)	$(C_6H_5)_2$		20.85 ± 0.2	EVD		1238
		***cyclo*-$C_6H_5CH_2^+$ Heat of formation 216 kcal mol^{-1}**				
		***cyclo*-$C_7H_7^+$ 209 kcal mol^{-1}**				
$C_7H_7^+$ (Vinylcyclopentadienyl radical)	$C_5H_4CH{=}CH_2$		8.44	SL		126
$C_7H_7^+$ (Benzyl radical)	$C_6H_5CH_2$		7.76 ± 0.08	SL	216*	69
$C_7H_7^+$ (Cycloheptatrienyl radical)	C_7H_7		6.240 ± 0.01	S	209*	2189
$C_7H_7^+$ (Cycloheptatrienyl radical)	C_7H_7		6.60 ± 0.1	SL	217	68
$C_7H_7^+$ (Cycloheptatrienyl radical)	C_7H_7		6.41	TC	213	136
$C_7H_7^+$ (Toluene)	$C_6H_5CH_3$	H	11.80	CS	232	2109
$C_7H_7^+$ (Cycloheptatriene)	C_7H_8	H	10.73	SL	239	219
$C_7H_7^+$ (Cycloheptatriene)	C_7H_8	H	10.1 ± 0.2	SL	224	68
$C_7H_7^+$ (Cycloheptatriene)	C_7H_8	H	10.68	VC	238	219
$C_7H_7^+$ (Cycloheptatriene)	C_7H_8	H	10.46	CS	233	2109
$C_7H_7^+$ (Cycloheptatriene)	C_7H_8	H	10.4 ± 0.1	CS	231	2108
$C_7H_7^+$ (Spiroheptadiene)	C_7H_8	H	10.45 ± 0.1	SL	241	1122
$C_7H_7^+$ (Bicyclo(2·2·1)heptadiene-2,4)	C_7H_8	H	9.75	EVD		2185
$C_7H_7^+$ (Bicyclo(2·2·1)heptadiene-2,5)	C_7H_8	H	9.6	CS	236	2109
$C_7H_7^+$ (Bicyclo(3·2·0)heptadiene-2,6)	C_7H_8	H	9.88	SL	238	219
$C_7H_7^+$ (Bicyclo(3·2·0)heptadiene-2,6)	C_7H_8	H	9.66	VC	233	219
$C_7H_7^+$ (Quadricyclene)	C_7H_8	H	9.56	EVD		2185
$C_7H_7^+$ (Quadricyclene)	C_7H_8	H	9.75	EVD		2185
$C_7H_7^+$ (1,3-Cycloheptadiene)	C_7H_{10}	$H_2 + H$	13.37	SL	278	219
$C_7H_7^+$ (Norbornene)	C_7H_{10}	$H_2 + H$	13.6 ± 0.3	LE	293	2155
$C_7H_7^+$	$CH_2{=}C(CH_3)C{\equiv}CC(CH_3){=}CH_2$	CH_3	10.5 ± 0.1	SL	277	1122
$C_7H_7^+$ (Ethylbenzene)	$C_6H_5C_2H_5$	CH_3	11.2 ± 0.1	SL	232	1122
$C_7H_7^+$ (Ethylbenzene)	$C_6H_5C_2H_5$	CH_3	11.25 ± 0.1	NS	233	135
$C_7H_7^+$ (*m*-xylene)	$C_6H_4(CH_3)_2$	CH_3	11.6 ± 0.1	SL	238	1122

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_7H_7^+$ (7-Methylcycloheptatriene)	C_8H_{10}	CH_3	10.0 ± 0.1	SL	235	1122
$C_7H_7^+$ (7-Methylcycloheptatriene)	C_8H_{10}	CH_3	9.5 ± 0.2	SL	223	68
$C_7H_7^+$ (1-Methylspiroheptadiene)	C_8H_{10}	CH_3	9.8 ± 0.1	SL	237	1122
$C_7H_7^+$ (2-Methylspiroheptadiene)	C_8H_{10}	CH_3	9.8 ± 0.1	SL	237	1122
$C_7H_7^+$ (6-Methylspiroheptadiene)	C_8H_{10}	CH_3	9.7 ± 0.1	SL	236	1122
$C_7H_7^+$ (1-Phenyldodecane)	$C_{18}H_{30}$		11.82 ± 0.1	EVD		2153
$C_7H_7^+$ (3-Phenyldodecane)	$C_{18}H_{30}$		12.05 ± 0.1	EVD		2153
$C_7H_7^+$ (7-Phenyltridecane)	$C_{19}H_{32}$		12.21 ± 0.1	EVD		2153
$C_7H_7^+$ (1-Phenyleicosane)	$C_{26}H_{46}$		11.83 ± 0.1	EVD		2153
$C_7H_7^+$ (2-Phenyleicosane)	$C_{26}H_{46}$		12.28 ± 0.1	EVD		2153
$C_7H_7^+$ (3-Phenyleicosane)	$C_{26}H_{46}$		12.24 ± 0.1	EVD		2153
$C_7H_7^+$ (4-Phenyleicosane)	$C_{26}H_{46}$		12.33 ± 0.1	EVD		2153
$C_7H_7^+$ (5-Phenyleicosane)	$C_{26}H_{46}$		12.34 ± 0.1	EVD		2153
$C_7H_7^+$ (7-Phenyleicosane)	$C_{26}H_{46}$		12.60 ± 0.1	EVD		2153
$C_7H_7^+$ (9-Phenyleicosane)	$C_{26}H_{46}$		12.09 ± 0.1	EVD		2153
$C_7H_7^+$ (N,N-d_2-Benzylamine)	$C_6H_5CH_2ND_2$	ND_2	11.7 ± 0.1	PI		1160
$C_7H_7^+$ (Phenyl methyl sulfide)	$C_6H_5SCH_3$	SH	12.0	SL	266	307
$C_7H_7^+$ (*endo*-5-Chloro-2-norbornene)	C_7H_9Cl	HCl + H	12.5 ± 0.3	LE	281	2155
$C_7H_7^+$ (*exo*-5-Chloro-2-norbornene)	C_7H_9Cl	HCl + H	12.6 ± 0.3	LE	284	2155
$C_7H_7^+$ (3-Chloronortricyclene)	C_7H_9Cl	HCl + H	12.2 ± 0.3	LE	266	2155
		$C_7H_5D_2^+$				
$C_7H_5D_2^+$ (α-d_2-benzyl radical)	$C_6H_5CD_2$		7.71	SL		0124

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	***cyclo*-$C_6H_5CH_3^+$ Heat of formation 215 kcal mol^{-1}**					
	***cyclo*-$C_7H_8^+$ 240 kcal mol^{-1}**					
	***bicyclo*(2 · 2 · 1)-$C_7H_8^+$ 267 kcal mol^{-1}**					
	***bicyclo*(3 · 2 · 0)-$C_7H_8^+$ 268 kcal mol^{-1}**					
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		8.82 ± 0.01	PI	215*	158, 182, 416
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		8.81 ± 0.02	PI	215*	1142, 1166
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		8.82	PI	215*	1159
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		10.12 ± 0.2	PE		1159
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		8.82	PI	215*	168
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		8.80 ± 0.1	RPD	215	2158
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.2 ± 0.1	RPD		2158
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.5 ± 0.1	RPD		2158
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.23 ± 0.05	SL	225	2163
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.18	SL	224	1066
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.12 ± 0.05	CS	222	2025
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.20 ± 0.05	CS	224	383
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.15 ± 0.1	CS	223	381
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.03	CS	220	2109
$C_7H_8^+$ (Toluene)	$C_6H_5CH_3$		9.01	TC	220	136
$C_7H_8^+$ (Cycloheptatriene)	C_7H_8		8.55 ± 0.1	SL	241*	68
$C_7H_8^+$ (Cycloheptatriene)	C_7H_8		8.52	SL	240*	219
$C_7H_8^+$ (Cycloheptatriene)	C_7H_8		8.47	VC	239	219
$C_7H_8^+$ (Cycloheptatriene)	C_7H_8		8.51	CS	240*	2109
$C_7H_8^+$ (Cycloheptatriene)	C_7H_8		7.89	TC	225	136
$C_7H_8^+$ (Bicyclo(2 · 2 · 1)heptadiene-2,4)	C_7H_8		8.60	EVD		2185
$C_7H_8^+$ (Bicyclo(2 · 2 · 1)heptadiene-2,5)	C_7H_8		8.67	CS	267*	2109
$C_7H_8^+$ (Bicyclo(3 · 2 · 0)heptadiene-2,6)	C_7H_8		8.92	SL	268*	219
$C_7H_8^+$ (Quadricyclene)	C_7H_8		8.70	EVD		2185
$C_7H_8^+$ (Quadricyclene)	C_7H_8		8.85	EVD		2185

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_7H_8^+$ (1,3-Cycloheptadiene)	C_7H_{10}	H_2	10.8	SL	271	219
$C_7H_8^+$ (Bicyclo(3 · 2 · 0)heptene-6)	C_7H_{10}	H_2	9.4	SL	247	219
$C_7H_8^+$ (1-Phenyldodecane)	$C_{18}H_{30}$		10.75 ± 0.1	EVD		2153
$C_7H_8^+$ (1-Phenyleicosane)	$C_{26}H_{46}$		11.35 ± 0.1	EVD		2153
		$C_7H_8^{+2}$				
$C_7H_8^{+2}$ (Toluene)	$C_6H_5CH_3$		24.5 ± 0.2	FDP	577	212
		$C_7H_8^{+3}$				
$C_7H_8^{+3}$ (Toluene)	$C_6H_5CH_3$		42 ± 5	NRE	981	212
		$C_7H_9^+$				
$C_7H_9^+$ (1,3-Cycloheptadiene)	C_7H_{10}	H	11.30	SL	231	219
$C_7H_9^+$ (Bicyclo(3 · 2 · 0)heptene-6)	C_7H_{10}	H	10.67	SL	224	219
$C_7H_9^+$ (Norbornene)	C_7H_{10}	H	11.5 ± 0.15	SL	244	2155
$C_7H_9^+$ (*endo*-5-Chloro-2-norbornene)	C_7H_9Cl	Cl	11.0 ± 0.15	SL	248	2155
$C_7H_9^+$ (*exo*-5-Chloro-2-norbornene)	C_7H_9Cl	Cl	11.1 ± 0.15	SL	250	2155
$C_7H_9^+$ (3-Chloronortricyclene)	C_7H_9Cl	Cl	10.7 ± 0.15	SL	233	2155
$C_7H_{10}^+$ (1,2-Dimethylcyclopentadiene) Heat of formation 204 kcal mol^{-1}						
$C_7H_{10}^+$ (5,5-Dimethylcyclopentadiene) 206 kcal mol^{-1}						
$C_7H_{10}^+$ (1,3-Cycloheptadiene) 219 kcal mol^{-1}						
$C_7H_{10}^+$ (Bicyclo(3 · 2 · 0)heptene-6) 246 kcal mol^{-1}						
$C_7H_{10}^+$ (Norbornene) 237 kcal mol^{-1}						
$C_7H_{10}^+$ (1,2-Dimethylcyclopentadiene)	C_7H_{10}		8.1 ± 0.1	SL	204*	2163
$C_7H_{10}^+$ (5,5-Dimethylcyclopentadiene)	C_7H_{10}		8.22 ± 0.05	SL	206*	2163
$C_7H_{10}^+$ (1,3-Cycloheptadiene)	C_7H_{10}		8.40	SL	216*	219
$C_7H_{10}^+$ (1,3-Cycloheptadiene)	C_7H_{10}		8.69	VC	223*	219
$C_7H_{10}^+$ (Bicyclo(3·2·0)heptene-6)	C_7H_{10}		9.37	SL	246*	219
$C_7H_{10}^+$ (Bicyclo(3·2·0)heptene-6)	C_7H_{10}		9.38	VC	246*	219
$C_7H_{10}^+$ (Norbornene)	C_7H_{10}		8.95 ± 0.15	SL	237*	2155

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_{11}^+$				
$C_7H_{11}^+$	C_9H_{16} (*cis*-Hexahydroindane)	C_2H_5	11.71 ± 0.05	EVD	211*	1184, 2028
$C_7H_{11}^+$	C_9H_{16} (*trans*-Hexahydroindane)	C_2H_5	11.80 ± 0.05	EVD	213*	1184, 2028
		$C_7H_{12}^+$ (4-Methylcyclohexane) Heat of formation 198 kcal mol^{-1}				
$C_7H_{12}^+$	C_7H_{12} (4-Methylcyclohexene)		8.91 ± 0.01	PI	198*	182
$C_7H_{12}^+$	C_9H_{16} (*cis*-Hexahydroindane)	C_2H_4	10.96 ± 0.03	EVD	206	1184, 2028
$C_7H_{12}^+$	C_9H_{16} (*trans*-Hexahydroindane)	C_2H_4	11.16 ± 0.03	EVD	211	1184, 2028
$C_7H_{12}^+$	$C_{10}H_{18}$ (*cis*-Decaline)	C_3H_6	10.72 ± 0.02	EVD	202	1182, 1183
$C_7H_{12}^+$	$C_{10}H_{18}$ (*trans*-Decaline)	C_3H_6	11.04 ± 0.02	EVD	206	1182, 1183
		***cyclo*-$C_6H_{10}CH_3^+$ Heat of formation 174 kcal mol^{-1}**				
$C_7H_{13}^+$	C_8H_{16} (*cis*-1,2-Dimethylcyclohexane)	CH_3	10.78 ± 0.02	EVD	174*	1145
$C_7H_{13}^+$	C_8H_{16} (*trans*-1,2-Dimethylcyclohexane)	CH_3	10.84 ± 0.02	EVD	174*	1145
		***cyclo*-$C_6H_{11}CH_3^+$ Heat of formation 190 kcal mol^{-1}**				
$C_7H_{14}^+$	C_7H_{14} (Methylcyclohexane)		9.85 ± 0.03	PI	190*	182
$C_7H_{14}^+$	C_7H_{14} (Methylcyclohexane)		10.19	SL	198	123
$C_7H_{14}^+$	C_7H_{14} (Methylcyclohexane)		9.91	TC	192	1352, 2020
$C_7H_{14}^+$	C_7H_{14} (Cycloheptane)		10.32	TC	209	1352, 2020
$C_7H_{14}^+$	C_7H_{14} (Cycloheptane)		10.72	TC	219	136
		***n*-$C_7H_{15}^+$ Heat of formation 164 kcal mol^{-1}**				
$C_7H_{15}^+$	*n*-C_8H_{18}	CH_3	10.705 ± 0.075	PI	164*	1120
$C_7H_{15}^+$	$(C_3H_7)_2CH$		7.56	TC	168	1006
		***n*-$C_7H_{16}^+$ Heat of formation 183 kcal mol^{-1}**				
$C_7H_{16}^+$	*n*-C_7H_{16}		9.90 ± 0.05	PI	183*	2013
$C_7H_{16}^+$	*n*-C_7H_{16}		10.08	PI	188	182
$C_7H_{16}^+$	*n*-C_7H_{16}		10.20	PE	190	1130
$C_7H_{16}^+$	*n*-C_7H_{16}		14.38	PE		1130
$C_7H_{16}^+$	*n*-C_7H_{16}		15.18	PE		1130
$C_7H_{16}^+$	*n*-C_7H_{16}		18.63?	PE		1130
$C_7H_{16}^+$	*n*-C_7H_{16}		19.86?	PE		1130

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_7H_{16}^+$	n-C_7H_{16}		10.05	TC	187	1439
$C_7H_{16}^+$	n-C_7H_{16}		10.07	TC	187	1439
$C_7H_{16}^+$	n-C_7H_{16}		10.33	TC	193	473
$C_7H_{16}^+$	n-C_7H_{16}		10.33	TC	193	1006
$C_7H_{16}^+$	n-C_7H_{16}		10.34	TC	194	1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		10.90	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		11.34	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		11.57	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		11.68	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		11.70	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		12.24	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		12.64	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		15.72	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		16.74	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		18.49	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		21.00	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		23.89	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		26.50	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		28.27	TC		1352, 2020
$C_7H_{16}^+$	n-C_7H_{16}		10.34	TC	194	2038
$C_7H_{16}^+$	n-C_7H_{16}		10.35	TC	194	2038
$C_7H_{16}^+$	n-C_7H_{16}		10.41	TC	195	136
		$C_8H_5^+$				
$C_8H_5^+$ (Naphthalene)	$C_{10}H_8$		18.07 ± 0.05	SL		2112
$C_8H_5^+$ (Azulene)	$C_{10}H_8$		16.3 ± 0.15	SL		2112
		***cyclo*-$C_6H_5C{\equiv}CH^+$ Heat of formation 279 kcal mol^{-1}**				
$C_8H_6^+$ (Phenylacetylene)	$C_6H_5C{\equiv}CH$		8.815 ± 0.005	PI	279*	182
$C_8H_6^+$ (Phenylacetylene)	$C_6H_5C{\equiv}CH$		9.10	TC	286	136
$C_8H_6^+$ (Cubane)	C_8H_8	H_2?	10.26 ± 0.21	EVD	385	2105
$C_8H_6^+$ (Naphthalene)	$C_{10}H_8$	C_2H_2?	15.4 ± 0.10	SL	334	2112
$C_8H_6^+$ (Azulene)	$C_{10}H_8$	C_2H_2?	13.6 ± 0.10	SL	332	2112
$C_8H_6^+$ (Biphenyl)	$(C_6H_5)_2$	$2C_2H_2$?	18.10 ± 0.05	SL	349	1238
$C_8H_6^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	C_6H_4?	17.8 ± 0.1	SL	346	1238
		$C_8H_7^+$				
$C_8H_7^+$ (Cubane)	C_8H_8	H	9.50 ± 0.11	EVD	316	2105

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	$C_8H_8^+$ (Styrene) Heat of formation 232 kcal mol^{-1}					
	$C_8H_8^+$ (Cyclooctatetraene) 255 kcal mol^{-1}					
	$C_8H_8^+$ (Cubane) 350 kcal mol^{-1}					
$C_8H_8^+$ (Styrene)	$C_6H_5CH{=}CH_2$		8.47 ± 0.02	PI	232*	182
$C_8H_8^+$ (Styrene)	$C_6H_5CH{=}CH_2$		9.00	SL	244	1066
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		7.99 ± 0.02	PI	255*	182
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		8.04	PE	256*	1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		9.49	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		10.84	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		11.49?	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		12.09	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		14.49	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		16.44?	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		17.69?	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		18.56?	PE		1130
$C_8H_8^+$ (Cyclooctatetraene)	C_8H_8		8.63 ± 0.15	CS	270	381
$C_8H_8^+$ (Cubane)	C_8H_8		8.74 ± 0.15	EVD	350*	2105
$C_8H_8^+$ (1-Phenyleicosane)	$C_{26}H_{46}$		12.2 ± 0.1	EVD		2153
	***m*-$C_6H_4CH_3CH_2^+$ Heat of formation 206 kcal mol^{-1}**					
	***p*-$C_6H_4CH_3CH_2^+$ 202 kcal mol^{-1}**					
$C_8H_9^+$ (*m*-Methylbenzyl radical)	$C_6H_4CH_3CH_2$		7.65 ± 0.03	SL	206*	69
$C_8H_9^+$ (*m*-Methylbenzyl radical)	$C_6H_4CH_3CH_2$		7.65	TC	206	136
$C_8H_9^+$ (*p*-Methylbenzyl radical)	$C_6H_4CH_3CH_2$		7.46 ± 0.03	SL	202*	69
$C_8H_9^+$ (*p*-Methylbenzyl radical)	$C_6H_4CH_3CH_2$		7.56	TC	204	136
$C_8H_9^+$	$CH_2{=}C(CH_3)C{\equiv}CC(CH_3){=}CH_2$	H	10.4 ± 0.1	SL	256	1122
$C_8H_9^+$ (Ethylbenzene)	$C_6H_5C_2H_5$	H	11.4 ± 0.1	SL	218	1122
$C_8H_9^+$ (7-Methylcycloheptatriene)	C_8H_{10}	H	11.0 ± 0.1	SL	239	1122
$C_8H_9^+$ (1-Methylspiroheptadiene)	C_8H_{10}	H	9.9 ± 0.1	SL	220	1122
$C_8H_9^+$ (2-Methylspiroheptadiene)	C_8H_{10}	H	9.9 ± 0.1	SL	220	1122
$C_8H_9^+$ (6-Methylspiroheptadiene)	C_8H_{10}	H	10.65 ± 0.1	SL	239	1122

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_8H_9^+$ (*p*-Ethyltoluene)	$C_6H_4CH_3C_2H_5$	CH_3	11.2 ± 0.1	SL	224	1122
$C_8H_9^+$ (*p*-Methyl-d_3-ethylbenzene)	$C_6H_4CD_3C_2H_5$	CD_3	11.2 ± 0.1	SL		2144
$C_8H_9^+$ (*p*-Ethyl-β-d_3-toluene)	$C_6H_4CH_3CH_2CD_3$	CD_3	11.2 ± 0.1	SL		2144
$C_8H_9^+$ (2-Phenyleicosane)	$C_{26}H_{46}$		10.83 ± 0.1	EVD		2153
$C_8H_9^+$ (3-Phenyleicosane)	$C_{26}H_{46}$		11.28 ± 0.1	EVD		2153
	***cyclo*-$C_6H_5C_2H_5^+$ Heat of formation 209 kcal mol^{-1}**					
	***o*-$C_6H_4(CH_3)_2^+$ 202 kcal mol^{-1}**					
	***m*-$C_6H_4(CH_3)_2^+$ 202 kcal mol^{-1}**					
	***p*-$C_6H_4(CH_3)_2^+$ 199 kcal mol^{-1}**					
	7-*cyclo*-$C_7H_7CH_3^+$ 231 kcal mol^{-1}					
	1-*spiro*-$C_7H_7CH_3^+$ 229 kcal mol^{-1}					
	2-*spiro*-$C_7H_7CH_3^+$ 230 kcal mol^{-1}					
	6-*spiro*-$C_7H_7CH_3^+$ 239 kcal mol^{-1}					
$C_8H_{10}^+$	$CH_2{=}C(CH_3)C{\equiv}CC(CH_3){=}CH_2$		8.95 ± 0.1	SL	275	1122
$C_8H_{10}^+$ (Ethylbenzene)	$C_6H_5C_2H_5$		8.76 ± 0.01	PI	209*	182
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		8.555	PI	202*	168
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		8.56 ± 0.01	PI	202*	182, 416
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		8.56 ± 0.02	PI	202*	1142, 1166, 1159
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		9.86 ± 0.2	PE		1159
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		8.88 ± 0.05	SL	209	2163
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		9.04	SL	213	1066
$C_8H_{10}^+$ (*o*-Xylene)	$C_6H_4(CH_3)_2$		8.76	TC	207	136
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.56 ± 0.01	PI	202*	182, 416
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.59 ± 0.02	PI	202*	1142, 1166, 1159
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		9.89 ± 0.2	PE		1159
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.56	PI	202*	168
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.88 ± 0.05	SL	209	2163
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.85 ± 0.1	SL	208	1122
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		9.05	SL	213	1066
$C_8H_{10}^+$ (*m*-Xylene)	$C_6H_4(CH_3)_2$		8.77	TC	206	136

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.445 ± 0.01	PI	199*	182, 416
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.445	PI	199*	168
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.44 ± 0.02	PI	199*	1142, 1166, 1159
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		9.74 ± 0.2	PE		1159
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.78 ± 0.05	SL	207	2163
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.99	SL	212	1066
$C_8H_{10}^+$ (*p*-Xylene)	$C_6H_4(CH_3)_2$		8.83	TC	208	136
$C_8H_{10}^+$ (Xylene)	$C_6H_4(CH_3)_2$		8.88	TC	209	2194
$C_8H_{10}^+$ (7-Methylcycloheptatriene)	C_8H_{10}		8.39 ± 0.1	SL	231*	1122
$C_8H_{10}^+$ (1-Methylspiroheptadiene)	C_8H_{10}		8.02 ± 0.1	SL	229*	1122
$C_8H_{10}^+$ (2-Methylspiroheptadiene)	C_8H_{10}		8.07 ± 0.1	SL	230*	1122
$C_8H_{10}^+$ (6-Methylspiroheptadiene)	C_8H_{10}		8.40 ± 0.1	SL	239*	1122
		$C_8H_{12}^+$				
$C_8H_{12}^+$ (1,2,3-Trimethylcyclopentadiene)	C_8H_{12}		7.96 ± 0.05	SL	194*	2163
$C_8H_{12}^+$ (1,5,5-Trimethylcyclopentadiene)	C_8H_{12}		8.00 ± 0.1	SL	193*	2163
$C_8H_{12}^+$ (4-Vinylcyclohexene)	$C_6H_9CH{=}CH_2$		8.93 ± 0.02	PI	224*	182
***cis*-1,2-*cyclo*-$C_6H_{10}(CH_3)_2^+$ Heat of formation 191 kcal mol^{-1}**						
***trans*-1,2-*cyclo*-$C_6H_{10}(CH_3)_2^+$ 189 kcal mol^{-1}**						
$C_8H_{16}^+$ (*cis*-1,2-Dimethylcyclohexane)	C_8H_{16}		10.08 ± 0.02	EVD	191*	1145
$C_8H_{16}^+$ (*trans*-1,2-Dimethylcyclohexane)	C_8H_{16}		10.08 ± 0.03	EVD	189*	1145
$C_8H_{16}^+$ (Cyclooctane)	C_8H_{16}		10.06	TC	202	1352, 2020
$C_8H_{16}^+$ (Cyclooctane)	C_8H_{16}		10.67	TC	216	136
***iso*-$C_4H_9C(CH_3)_3^+$ Heat of formation 174 kcal mol^{-1}**						
$C_8H_{18}^+$	*n*-C_8H_{18}		10.03	TC	181	1439
$C_8H_{18}^+$	*n*-C_8H_{18}		10.25	TC	187	473
$C_8H_{18}^+$	*n*-C_8H_{18}		10.27	TC	187	1006
$C_8H_{18}^+$	*n*-C_8H_{18}		10.28	TC	187	1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		10.76	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		11.20	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		11.47	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		11.62	TC		1352, 2020

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_8H_{18}^+$	*n*-C_8H_{18}		11.69	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		11.70	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		12.24	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		12.64	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		15.65	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		16.47	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		17.86	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		19.87	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		22.35	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		24.87	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		27.00	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		28.41	TC		1352, 2020
$C_8H_{18}^+$	*n*-C_8H_{18}		10.29	TC	187	2038
$C_8H_{18}^+$	*n*-C_8H_{18}		10.30	TC	188	2038
$C_8H_{18}^+$	*n*-C_8H_{18}		10.38	TC	190	136
$C_8H_{18}^+$	*iso*-$C_4H_9C(CH_3)_3$		9.86	PI	174*	182
$C_8H_{18}^+$	*iso*-$C_4H_9C(CH_3)_3$		9.91	PE	175	1130
$C_8H_{18}^+$	*iso*-$C_4H_9C(CH_3)_3$		11.95?	PE		1130
$C_8H_{18}^+$	*iso*-$C_4H_9C(CH_3)_3$		14.09?	PE		1130
$C_8H_{18}^+$	*iso*-$C_4H_9C(CH_3)_3$		19.74?	PE		1130
		$C_9H_5^+$				
$C_9H_5^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	*cyclo*-C_5H_5?	21.3 ± 0.2	SL		1238
		$C_9H_7^+$				
$C_9H_7^+$ (γ-Phenylpropargyl radical)	$C_6H_5CHC{\equiv}CH$		7.69	TC	269	136
$C_9H_7^+$ (Indenyl radical)	C_9H_7		8.35	SL		126
$C_9H_7^+$ (Biphenyl)	$(C_6H_5)_2$	$CH_2C{\equiv}CH$?	16.08 ± 0.05	SL	335	1238
$C_9H_7^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	C_5H_3?	17.5 ± 0.1	SL		1238
$C_9H_7^+$ (Phenyl ether)	$(C_6H_5)_2O$	C_3H_3O?	16.68 ± 0.15	SL		1237
		$C_9H_8^+$ (Indene) Heat of formation 246 kcal mol^{-1}				
$C_9H_8^+$ (Methylphenylacetylene)	$C_6H_5C{\equiv}CCH_3$		8.79	TC	269	136
$C_9H_8^+$ (Indene)	C_9H_8		8.81	SL	246*	126
$C_9H_8^+$ (Indene)	C_9H_8		8.63	TC	242	136
		$C_9H_{10}^+$				
$C_9H_{10}^+$ (α-Methylstyrene)	$C_6H_5C(CH_3){=}CH_2$		8.35 ± 0.01	PI	220*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_9H_{11}^+$				
$C_9H_{11}^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (2,5-Dimethylethyl-β-d_3-benzene)	CD_3	10.5	SL		2144
$C_9H_{11}^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (3,4-Dimethylethyl-β-d_3-benzene)	CD_3	10.5	SL		2144
$C_9H_{11}^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (3,5-Dimethylethyl-β-d_3-benzene)	CD_3	10.5	SL		2144
$C_9H_{11}^+$	$C_{18}H_{30}$ (3-Phenyldodecane)		10.42 ± 0.1	EVD		2153
$C_9H_{11}^+$	$C_{26}H_{46}$ (3-Phenyleicosane)		10.69 ± 0.1	EVD		2153
$C_9H_{11}^+$	$C_{26}H_{46}$ (3-Phenyleicosane)		11.36 ± 0.1	EVD		2153
		$C_9H_8D_3^+$				
$C_9H_8D_3^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (2,5-Dimethylethyl-β-d_3-benzene)	CH_3	10.5	SL		2144
$C_9H_8D_3^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (3,4-Dimethylethyl-β-d_3-benzene)	CH_3	10.5	SL		2144
$C_9H_8D_3^+$	$C_6H_3(CH_3)_2CH_2CD_3$ (3,5-Dimethylethyl-β-d_3-benzene)	CH_3	10.5	SL		2144
		***cyclo*-$C_6H_5(n$-$C_3H_7)^+$ Heat of formation 203 kcal mol^{-1}**				
		***cyclo*-$C_6H_5(iso$-$C_3H_7)^+$ 210 kcal mol^{-1}**				
		1,2,3-*cyclo*-$C_6H_3(CH_3)_3^+$ 193 kcal mol^{-1}				
		1,2,4-*cyclo*-$C_6H_3(CH_3)_3^+$ 187 kcal mol^{-1}				
		1,3,5-*cyclo*-$C_6H_3(CH_3)_3^+$ 190 kcal mol^{-1}				
$C_9H_{12}^+$	$C_6H_5C_3H_7$ (n-Propylbenzene)		8.72 ± 0.01	PI	203*	182, 416
$C_9H_{12}^+$	$C_6H_5C_3H_7$ (Isopropylbenzene)		8.69 ± 0.01	PI	201*	182, 416
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,2,3-Trimethylbenzene)		8.48	PI	193*	168
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,2,3-Trimethylbenzene)		8.67 ± 0.05	SL	198	2163
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,2,3-Trimethylbenzene)		8.49	TC	193	136
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,2,4-Trimethylbenzene)		8.27	PI	187*	168
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,2,4-Trimethylbenzene)		8.55 ± 0.05	SL	194	2163
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.40 ± 0.01	PI	190*	182
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.39 ± 0.02	PI	190*	416
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.41 ± 0.02	PI	190*	1142, 1159, 1166
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.39	PI	190*	168
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		9.71 ± 0.2	PE		1159
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.64 ± 0.05	SL	195	2163
$C_9H_{12}^+$	$C_6H_3(CH_3)_3$ (1,3,5-Trimethylbenzene)		8.74	SL	198	1066

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_9H_{14}^+$				
$C_9H_{14}^+$ (1,2,3,4-Tetramethylcyclopentadiene)	C_9H_{14}		7.8 ± 0.1	SL	181*	2163
$C_9H_{14}^+$ (1,4,5,5-Tetramethylcyclopentadiene)	C_9H_{14}		7.84 ± 0.05	SL	182*	2163
		$C_9H_{16}^+$				
$C_9H_{16}^+$ (*cis*-Hexahydroindane)	C_9H_{16}		10.13 ± 0.03	EVD	200*	1184, 2028
$C_9H_{16}^+$ (*trans*-Hexahydroindane)	C_9H_{16}		10.18 ± 0.03	EVD	201*	1184, 2028
		$C_9H_{20}^+$				
$C_9H_{20}^+$	n-C_9H_{20}		10.02	TC	176	1439
$C_9H_{20}^+$	n-C_9H_{20}		10.22	TC	181	1006
$C_9H_{20}^+$	n-C_9H_{20}		10.23	TC	181	1352, 2020
$C_9H_{20}^+$	n-C_9H_{20}		10.26	TC	182	2038
$C_9H_{20}^+$	n-C_9H_{20}		10.27	TC	182	2038
$C_9H_{20}^+$	n-C_9H_{20}		10.36	TC	184	136
		$C_{10}H_6^+$ Heat of formation 409 kcal mol^{-1}				
$C_{10}H_6^+$ (Naphthalene)	$C_{10}H_8$	H_2	16.2 ± 0.15	SL	407*	2112
$C_{10}H_6^+$ (Azulene)	$C_{10}H_8$	H_2	14.7 ± 0.10	SL	411*	2112
$C_{10}H_6^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	$2C_2H_2$	18.23 ± 0.1	SL	411	1238
$C_{10}H_6^+$ (Phenanthrene)	$H_{14}H_{10}$	$2C_2H_2$	20.9 ± 0.3	SL	421	1238
		$C_{10}H_7^+$ Heat of formation 339 kcal mol^{-1}				
$C_{10}H_7^+$ (Naphthalene)	$C_{10}H_8$	H	15.4 ± 0.10	SL	336*	2112
$C_{10}H_7^+$ (Azulene)	$C_{10}H_8$	H	14.0 ± 0.10	SL	343*	2112
		$C_{10}H_8^+$ (Naphthalene) Heat of formation 220 kcal mol^{-1}				
		$C_{10}H_8^+$ (Azulene) 243 kcal mol^{-1}				
$C_{10}H_8^+$ (Naphthalene)	$C_{10}H_8$		8.12 ± 0.01	PI	220*	182, 416
$C_{10}H_8^+$ (Naphthalene)	$C_{10}H_8$		8.14 ± 0.02	PI	221*	1166
$C_{10}H_8^+$ (Naphthalene)	$C_{10}H_8$		8.26 ± 0.05	SL	223	2112, 413
$C_{10}H_8^+$ (Naphthalene)	$C_{10}H_8$		8.15	TC	221	1064
$C_{10}H_8^+$ (Naphthalene)	$C_{10}H_8$		8.63	TC	232	136

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.431 ± 0.006	S	244*	1420
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.412	S	243*	1459
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.72 ± 0.05	SL	251	2112
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.4	CTS	243	2037
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.5	CTS	245	2037
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		7.43	TC	244	1315
$C_{10}H_8^+$ (Azulene)	$C_{10}H_8$		8.32	TC	264	136
$C_{10}H_8^+$ (Biphenyl)	$(C_6H_5)_2$	C_2H_2	14.81 ± 0.05	SL	327	1238
$C_{10}H_8^{+2}$ (Naphthalene) Heat of formation 557 kcal mol^{-1}						
$C_{10}H_8^{+2}$ (Naphthalene)	$C_{10}H_8$		22.8 ± 0.2	FDP	559*	212
$C_{10}H_8^{+2}$ (Naphthalene)	$C_{10}H_8$		22.7	NS	556*	413
$C_{10}H_8^{+3}$						
$C_{10}H_8^{+3}$ (Naphthalene)	$C_{10}H_8$		40 ± 5	NRE	955	212
$C_{10}H_{13}^+$						
$C_{10}H_{13}^+$ (*p*-Isopropylbenzyl radical)	$C_6H_4C_3H_7CH_2$		7.42 ± 0.1	SL	188*	69
$C_{10}H_{13}^+$ (1-Phenyldodecane)	$C_{18}H_{30}$		11.07 ± 0.1	EVD		2153
$C_{10}H_{13}^+$ (1-Phenyleicosane)	$C_{26}H_{46}$		10.86 ± 0.1	EVD		2153
$C_{10}H_{13}^+$ (4-Phenyleicosane)	$C_{26}H_{46}$		10.58 ± 0.1	EVD		2153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	***cyclo*-$C_6H_5(n\text{-}C_4H_9)^+$ Heat of formation 197 kcal mol^{-1}**					
	***cyclo*-$C_6H_5(sec\text{-}C_4H_9)^+$ 196 kcal mol^{-1}**					
	***cyclo*-$C_6H_5(tert\text{-}C_4H_9)^+$ 193 kcal mol^{-1}**					
	1,2,3,5-*cyclo*-$C_6H_2(CH_3)_4^+$ 185 kcal mol^{-1}					
	1,2,4,5-*cyclo*-$C_6H_2(CH_3)_4^+$ 174 kcal mol^{-1}					
$C_{10}H_{14}^+$ (*n*-Butylbenzene)	$C_6H_5C_4H_9$		8.69 ± 0.01	PI	197*	182, 416
$C_{10}H_{14}^+$ (*sec*-Butylbenzene)	$C_6H_5C_4H_9$		8.68 ± 0.1	PI	196*	182
$C_{10}H_{14}^+$ (*tert*-Butylbenzene)	$C_6H_5C_4H_9$		8.68 ± 0.01	PI	193*	182
$C_{10}H_{14}^+$ (1,2,3,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		8.47 ± 0.05	SL	185*	2163
$C_{10}H_{14}^+$ (1,2,4,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		8.025 ± 0.005	PI	174*	182
$C_{10}H_{14}^+$ (1,2,4,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		8.05 ± 0.02	PI	175*	1142, 1159, 1166
$C_{10}H_{14}^+$ (1,2,4,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		8.03	PI	174*	168
$C_{10}H_{14}^+$ (1,2,4,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		9.35 ± 0.2	PE		1159
$C_{10}H_{14}^+$ (1,2,4,5-Tetramethylbenzene)	$C_6H_2(CH_3)_4$		8.50 ± 0.05	SL	185	2163
	$C_{10}H_{16}^+$					
$C_{10}H_{16}^+$ (1,2,3,5,5 and 1,2,4,5,5-Pentamethylcyclopentadiene mixture)	$C_{10}H_{16}$		7.77 ± 0.05	SL	173	2163
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		8.07	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		9.25	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		11.43	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		13.12	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		14.53	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		15.74?	PE		1130
$C_{10}H_{16}^+$ (α-Pinene)	$C_{10}H_{16}$		18.57?	PE		1130
	$C_{10}H_{18}^+$					
$C_{10}H_{18}^+$ (*cis*-Decaline)	$C_{10}H_{18}$		9.61 ± 0.02	EVD	181*	1182, 1183
$C_{10}H_{18}^+$ (*trans*-Decaline)	$C_{10}H_{18}$		9.61 ± 0.02	EVD	178*	1182, 1183

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{10}H_{22}^+$				
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		9.95	TC	170	1439
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.19	TC	175	473
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.19	TC	175	1006
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.20	TC	176	1352, 2020
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.24	TC	176	2038
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.25	TC	177	2038
$C_{10}H_{22}^+$	n-$C_{10}H_{22}$		10.33	TC	179	0136
		$C_{11}H_7^+$				
$C_{11}H_7^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	$CH_2C{\equiv}CH$?	17.52 ± 0.1	SL	428	1238
$C_{11}H_7^+$ (Phenanthrene)	$C_{14}H_{10}$	$CH_2C{\equiv}CH$?	21.1 ± 0.3	SL	459	1238
		$C_{11}H_9^+$				
$C_{11}H_9^+$ (1-Naphthylmethyl radical)	$C_{10}H_7CH_2$		7.35 ± 0.1	SL		71
$C_{11}H_9^+$ (2-Naphthylmethyl radical)	$C_{10}H_7CH_2$		7.56 ± 0.05	SL		69, 71
$C_{11}H_9^+$ (Phenyl ether)	$(C_6H_5)_2O$	CO + H	14.02 ± 0.05	SL	315	1237
$C_{11}H_9^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$		13.90 ± 0.05	SL		1237
		$C_{11}H_{10}^+$ (Methylnaphthalene) Heat of formation 209 kcal mol^{-1}				
$C_{11}H_{10}^+$ (1-Methylnaphthalene)	$C_{11}H_{10}$		7.96 ± 0.01	PI	209*	182, 416
$C_{11}H_{10}^+$ (1-Methylnaphthalene)	$C_{11}H_{10}$		8.41	TC	219	136
$C_{11}H_{10}^+$ (2-Methylnaphthalene)	$C_{11}H_{10}$		7.955 ± 0.01	PI	209*	182
$C_{11}H_{10}^+$ (2-Methylnaphthalene)	$C_{11}H_{10}$		8.48	TC	221	136
$C_{11}H_{10}^+$ (Phenyl ether)	$(C_6H_5)_2O$	CO	12.56 ± 0.08	SL	333	1237
$C_{11}H_{10}^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$	$CO + CO_2$	12.41 ± 0.1	SL	321	1237
		$C_{11}H_{15}^+$				
$C_{11}H_{15}^+$ (5-Phenyleicosane)	$C_{26}H_{46}$		10.43 ± 0.1	EVD		2153
		***cyclo*-$\dot{C}_6H(CH_3)_5^+$ Heat of formation 155 kcal mol^{-1}**				
$C_{11}H_{16}^+$ (Pentamethylbenzene)	$C_6H(CH_3)_5$		7.92 ± 0.02	PI	155*	1142, 1166
$C_{11}H_{16}^+$ (Pentamethylbenzene)	$C_6H(CH_3)_5$		7.92	PI	155*	168
$C_{11}H_{16}^+$ (Pentamethylbenzene)	$C_6H(CH_3)_5$		8.30 ± 0.05	SL	164	2163

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{11}H_{18}^+$				
$C_{11}H_{18}^+$ (Hexamethylcyclopentadiene)	$C_{11}H_{18}$		7.74 ± 0.05	SL	165*	2163
		$C_{11}H_{24}^+$				
$C_{11}H_{24}^+$	n-$C_{11}H_{24}$		9.93	TC	164	1439
		$C_{12}H_7^+$				
$C_{12}H_7^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	$C_2H_2 + H$	17.46 ± 0.06	SL	395	1238
$C_{12}H_7^+$ (Phenanthrene)	$C_{14}H_{10}$	$C_2H_2 + H$	19.63 ± 0.05	SL	394	1238
		$C_{12}H_8^+$				
$C_{12}H_8^+$ (Biphenylene)	$C_{12}H_8$		8.15	TC		348
$C_{12}H_8^+$ (Acenaphthylene)	$C_{12}H_8$		8.73	TC		136
$C_{12}H_8^+$ (Biphenyl)	$(C_6H_5)_2$	H_2	16.89 ± 0.08	SL	429	1238
$C_{12}H_8^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	C_2H_2	15.58 ± 0.05	SL	404	1238
$C_{12}H_8^+$ (Phenanthrene)	$C_{14}H_{10}$	C_2H_2	16.63 ± 0.05	SL	377	1238
$C_{12}H_8^+$ (Benzophenone)	$(C_6H_5)_2CO$	$CO + H_2$?	17.48 ± 0.12	SL	442	1237
		$C_{12}H_8^{+2}$				
$C_{12}H_8^{+2}$ (Biphenyl)	$(C_6H_5)_2$	H_2	22.0 ± 1.0	NS	547	1238
$C_{12}H_8^{+2}$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	C_2H_2	20.5 ± 0.1	NS	518	1238
		$C_{12}H_9^+$				
$C_{12}H_9^+$ (Biphenyl)	$(C_6H_5)_2$	H	14.36 ± 0.05	SL	319	1238
$C_{12}H_9^+$ (Benzophenone)	$(C_6H_5)_2CO$	CO + H?	15.28 ± 0.05	SL	339	1237
		$C_{12}H_{10}^+$ (Biphenyl) Heat of formation 230 kcal mol^{-1}				
$C_{12}H_{10}^+$ (Biphenyl)	$(C_6H_5)_2$		8.27 ± 0.01	PI	230*	182
$C_{12}H_{10}^+$ (Biphenyl)	$(C_6H_5)_2$		8.96 ± 0.05	SL	246	1238
$C_{12}H_{10}^+$ (Biphenyl)	$(C_6H_5)_2$		8.53	TC	236	348
$C_{12}H_{10}^+$ (Biphenyl)	$(C_6H_5)_2$		8.79	TC	242	136
$C_{12}H_{10}^+$ (Benzophenone)	$(C6H_5)_2CO$	CO	12.24 ± 0.13	SL	321	1237

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{12}H_{10}^{+2}$				
$C_{12}H_{10}^{+2}$ (Biphenyl)	$(C_6H_5)_2$		21.9 ± 0.3	NS	545	1238
		***cyclo*-$C_6(CH_3)_6^+$ Heat of formation 152 kcal mol^{-1}**				
$C_{12}H_{18}^+$ (Hexamethylbenzene)	$C_6(CH_3)_6$		7.85 ± 0.02	PI	152*	1142
$C_{12}H_{18}^+$ (Hexamethylbenzene)	$C_6(CH_3)_6$		7.85	PI	152*	168
		$C_{12}H_{26}^+$				
$C_{12}H_{26}^+$	n-$C_{12}H_{26}$		9.93	TC	159	1439
		$C_{13}H_9^+$				
$C_{13}H_9^+$ (Fluorenyl radical)	$C_{13}H_9$		7.07	SL		126
$C_{13}H_9^+$ (Perinaphthenyl radical)	$C_{13}H_9$		7.31	TC		136
		$C_{13}H_{10}^+$				
$C_{13}H_{10}^+$ (Fluorene)	$C_{13}H_{10}$		8.63	SL	243*	126
$C_{13}H_{10}^+$ (Fluorene)	$C_{13}H_{10}$		8.56	TC	241	136
		$C_{13}H_{11}^+$				
$C_{13}H_{11}^+$ (Diphenylmethyl radical)	$(C_6H_5)_2CH$		7.32 ± 0.1	SL	217*	71
$C_{13}H_{11}^+$ (Diphenylmethyl radical)	$(C_6H_5)_2CH$		7.42	TC	219	136
		$C_{13}H_{19}^+$				
$C_{13}H_{19}^+$ (7-Phenyltridecane)	$C_{19}H_{32}$	n-C_6H_{13}	10.15 ± 0.1	EVD	181	2153
$C_{13}H_{19}^+$ (7-Phenyleicosane)	$C_{26}H_{46}$		10.28 ± 0.1	EVD		2153
		$C_{13}H_{28}^+$				
$C_{13}H_{28}^+$	n-$C_{13}H_{28}$		9.92	TC	154	1439
		$C_{14}H_8^+$				
$C_{14}H_8^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	H_2	16.66 ± 0.05	SL	483	1238
$C_{14}H_8^+$ (Phenanthrene)	$C_{14}H_{10}$	H_2	18.58 ± 0.1	SL	476	1238

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{14}H_9^+$				
$C_{14}H_9^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$	H	15.13 ± 0.1	SL	396	1238
$C_{14}H_9^+$ (Phenanthrene)	$C_{14}H_{10}$	H	16.25 ± 0.1	SL	370	1238
		$C_{14}H_{10}^+$ (Diphenylacetylene) Heat of formation 303 kcal mol^{-1}				
		$C_{14}H_{10}^+$ (Anthracene) 228 kcal mol^{-1}				
		$C_{14}H_{10}^+$ (Phenanthrene) 233 kcal mol^{-1}				
$C_{14}H_{10}^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$		8.85 ± 0.05	SL	303*	1238
$C_{14}H_{10}^+$ (Diphenylacetylene)	$(C_6H_5)_2C_2$		8.55	TC	296	136
$C_{14}H_{10}^+$ (Anthracene)	$C_{14}H_{10}$		7.55	SL	228*	413
$C_{14}H_{10}^+$ (Anthracene)	$C_{14}H_{10}$		7.2	CTS	220	2037
$C_{14}H_{10}^+$ (Anthracene)	$C_{14}H_{10}$		7.25	TC	221	348
$C_{14}H_{10}^+$ (Anthracene)	$C_{14}H_{10}$		7.42	TC	225	1064
$C_{14}H_{10}^+$ (Anthracene)	$C_{14}H_{10}$		8.11	TC	241	136
$C_{14}H_{10}^+$ (Phenanthrene)	$C_{14}H_{10}$		8.10 ± 0.04	SL	234*	1238
$C_{14}H_{10}^+$ (Phenanthrene)	$C_{14}H_{10}$		8.03	SL	233*	413
$C_{14}H_{10}^+$ (Phenanthrene)	$C_{14}H_{10}$		7.94	TC	231	348
$C_{14}H_{10}^+$ (Phenanthrene)	$C_{14}H_{10}$		8.07	TC	234	1064
$C_{14}H_{10}^+$ (Phenanthrene)	$C_{14}H_{10}$		8.50	TC	244	136
		$C_{14}H_{10}^{+2}$				
$C_{14}H_{10}^{+2}$ (Diphenylacetylene)	$(C_6H_5)_2C_2$		23.35 ± 0.1	NS	637	1238
$C_{14}H_{10}^{+2}$ (Anthracene)	$C_{14}H_{10}$		21.1	NS	540	413
$C_{14}H_{10}^{+2}$ (Phenanthrene)	$C_{14}H_{10}$		23.1	NS	580	413
		$C_{14}H_{30}^+$				
$C_{14}H_{30}^+$	n-$C_{14}H_{30}$		9.92	TC	149	1439
		$C_{15}H_{23}^+$				
$C_{15}H_{23}^+$ (9-Phenyleicosane)	$C_{26}H_{46}$		10.30 ± 0.1	EVD		2153
		$C_{15}H_{32}^+$				
$C_{15}H_{32}^+$	n-$C_{15}H_{32}$		9.91	TC	144	1439

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{16}H_{10}^+$				
$C_{16}H_{10}^+$ (Fluoranthene)	$C_{16}H_{10}$		8.54	TC		136
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		7.72	SL		1069
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		7.31	CTS		2037
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		8.35	CTS		2037
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		7.06	TC		348
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		7.70	TC		1064
$C_{16}H_{10}^+$ (Pyrene)	$C_{16}H_{10}$		8.13	TC		136
		$C_{16}H_{25}^+$				
$C_{16}H_{25}^+$ (3-Phenyldodocane)	$C_{18}H_{30}$	C_2H_5?	9.26 ± 0.1	EVD	145	2153
		$C_{16}H_{34}^+$				
$C_{16}H_{34}^+$	n-$C_{16}H_{34}$		9.91	TC	139	1439
		$C_{17}H_{36}^+$				
$C_{17}H_{36}^+$	n-$C_{17}H_{36}$		9.89	TC	134	1439
		$C_{18}H_{12}^+$ (1,2-Benzophenanthrene) Heat of formation 251 kcal mol^{-1}				
$C_{18}H_{12}^+$ (1,2-Benzanthracene)	$C_{18}H_{12}$		7.53	SL		1069
$C_{18}H_{12}^+$ (1,2-Benzanthracene)	$C_{18}H_{12}$		7.11	TC		348
$C_{18}H_{12}^+$ (1,2-Benzanthracene)	$C_{18}H_{12}$		7.52	TC		1064
$C_{18}H_{12}^+$ (2,3-Benzanthracene)	$C_{18}H_{12}$		6.95	SL		1069
$C_{18}H_{12}^+$ (2,3-Benzanthracene)	$C_{18}H_{12}$		6.92	TC		348
$C_{18}H_{12}^+$ (2,3-Benzanthracene)	$C_{18}H_{12}$		6.94	TC		1064
$C_{18}H_{12}^+$ (2,3-Benzanthracene)	$C_{18}H_{12}$		7.81	TC		136
$C_{18}H_{12}^+$ (1,2-Benzophenanthrene)	$C_{18}H_{12}$		8.01	SL	251*	1069
$C_{18}H_{12}^+$ (1,2-Benzophenanthrene)	$C_{18}H_{12}$		7.70	TC	244	348
$C_{18}H_{12}^+$ (1,2-Benzophenanthrene)	$C_{18}H_{12}$		7.82	TC	247	1064
$C_{18}H_{12}^+$ (3,4-Benzophenanthrene)	$C_{18}H_{12}$		7.88	TC		348
$C_{18}H_{12}^+$ (3,4-Benzophenanthrene)	$C_{18}H_{12}$		8.36	TC		136
$C_{18}H_{12}^+$ (9,10-Benzophenanthrene)	$C_{18}H_{12}$		8.19	SL		1069
$C_{18}H_{12}^+$ (9,10-Benzophenanthrene)	$C_{18}H_{12}$		8.02	TC		348

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{18}H_{14}^+$				
$C_{18}H_{14}^+$ (*o*-Diphenylbenzene)	$C_{18}H_{14}$		8.09	TC		348
$C_{18}H_{14}^+$ (*m*-Diphenylbenzene)	$C_{18}H_{14}$		8.25	TC		348
		$C_{18}H_{29}^+$				
$C_{18}H_{29}^+$ (9-Phenyleicosane)	$C_{26}H_{46}$		10.12 ± 0.1	EVD		2153
		$C_{18}H_{30}^+$				
$C_{18}H_{30}^+$ (1-Phenyldodecane)	$C_{18}H_{30}$		9.05 ± 0.1	EVD	165*	2153
$C_{18}H_{30}^+$ (3-Phenyldodecane)	$C_{18}H_{30}$		8.95 ± 0.1	EVD	163*	2153
		$C_{19}H_{15}^+$				
$C_{19}H_{15}^+$ (Triphenylmethyl radical)	$(C_6H_5)_3C$		7.26	TC		136
		$C_{19}H_{32}^+$				
$C_{19}H_{32}^+$ (7-Phenyltridecane)	$C_{19}H_{32}$		8.91 ± 0.1	EVD	157*	2153
		$C_{20}H_{12}^+$				
$C_{20}H_{12}^+$ (Perylene)	$C_{20}H_{12}$		6.85	CTS		2037
$C_{20}H_{12}^+$ (Perylene)	$C_{20}H_{12}$		6.94	TC		348
$C_{20}H_{12}^+$ (Perylene)	$C_{20}H_{12}$		7.10	TC		1064
		$C_{20}H_{33}^+$				
$C_{20}H_{33}^+$ (7-Phenyleicosane)	$C_{26}H_{46}$		9.94 ± 0.1	EVD		2153
		$C_{21}H_{15}^+$				
$C_{21}H_{15}^+$ (1,2,3-Triphenylcyclopropenyl radical)	$(C_6H_5)_3C_3$		6.38	TC		136
		$C_{22}H_{12}^+$				
$C_{22}H_{12}^+$ (Anthanthrene)	$C_{22}H_{12}$		7.10	TC		1064
$C_{22}H_{12}^+$ (1,12-Benzoperylene)	$C_{22}H_{12}$		7.24	TC		348

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{22}H_{14}^+$				
$C_{22}H_{14}^+$ (Pentacene)	$C_{22}H_{14}$		6.61	TC		1064
$C_{22}H_{14}^+$ (Pentacene)	$C_{22}H_{14}$		6.73	TC		348
$C_{22}H_{14}^+$ (1,2,3,4-Dibenzanthracene)	$C_{22}H_{14}$		8.18	TC		348
$C_{22}H_{14}^+$ (1,2,5,6-Dibenzanthracene)	$C_{22}H_{14}$		7.09	TC		348
$C_{22}H_{14}^+$ (1,2,5,6-Dibenzanthracene)	$C_{22}H_{14}$		7.57	TC		1064
$C_{22}H_{14}^+$ (1,2,7,8-Dibenzanthracene)	$C_{22}H_{14}$		6.99	TC		348
$C_{22}H_{14}^+$ (Pentaphene)	$C_{22}H_{14}$		7.11	TC		348
$C_{22}H_{14}^+$ (Picene)	$C_{22}H_{14}$		7.51	TC		348
		$C_{22}H_{37}^+$				
$C_{22}H_{37}^+$ (5-Phenyleicosane)	$C_{26}H_{46}$	n-C_4H_9	9.99 ± 0.1	EVD	129	2153
		$C_{23}H_{39}^+$				
$C_{23}H_{39}^+$ (4-Phenyleicosane)	$C_{26}H_{46}$	n-C_3H_7	9.76 ± 0.1	EVD	120	2153
		$C_{24}H_{12}^+$				
$C_{24}H_{12}^+$ (Coronene)	$C_{24}H_{12}$		7.56	TC		348
$C_{24}H_{12}^+$ (Coronene)	$C_{24}H_{12}$		7.64	TC		1064
		$C_{24}H_{41}^+$				
$C_{24}H_{41}^+$ (3-Phenyleicosane)	$C_{26}H_{46}$	C_2H_5	9.68 ± 0.1	EVD	115	2153
		$C_{25}H_{43}^+$				
$C_{25}H_{43}^+$ (2-Phenyleicosane)	$C_{26}H_{46}$	CH_3	10.14 ± 0.1	EVD	117	2153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{26}H_{46}^+$				
$C_{26}H_{46}^+$ (1-Phenyleicosane)	$C_{26}H_{46}$		9.34 ± 0.1	EVD	134*	2153
$C_{26}H_{46}^+$ (2-Phenyleicosane)	$C_{26}H_{46}$		9.22 ± 0.1	EVD	129*	2153
$C_{26}H_{46}^+$ (3-Phenyleicosane)	$C_{26}H_{46}$		8.95 ± 0.1	EVD	123*	2153
$C_{26}H_{46}^+$ (4-Phenyleicosane)	$C_{26}H_{46}$		9.01 ± 0.1	EVD	125*	2153
$C_{26}H_{46}^+$ (5-Phenyleicosane)	$C_{26}H_{46}$		9.04 ± 0.1	EVD	125*	2153
$C_{26}H_{46}^+$ (7-Phenyleicosane)	$C_{26}H_{46}$		8.97 ± 0.1	EVD	124*	2153
$C_{26}H_{46}^+$ (9-Phenyleicosane)	$C_{26}H_{46}$		9.06 ± 0.1	EVD	126*	2153
		$C_{28}H_{14}^+$				
$C_{28}H_{14}^+$ (Mesonaphthodianthrene)	$C_{28}H_{14}$		6.42	TC		1064
		$C_{30}H_{16}^+$				
$C_{30}H_{16}^+$ (Pyranthrene)	$C_{30}H_{16}$		6.98	TC		1064
		$C_{32}H_{14}^+$				
$C_{32}H_{14}^+$ (Ovalene)	$C_{32}H_{14}$		7.01	TC		1064
		$C_{34}H_{20}^+$				
$C_{34}H_{20}^+$ (Violanthrene)	$C_{34}H_{20}$		6.86	TC		1064
$C_{34}H_{20}^+$ (Isoviolanthrene)	$C_{34}H_{20}$		6.76	TC		1064

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CB^+				
CB^+	CB		10.0 ± 0.6	LE	430	2176
CB^+	CB		10.5	NS	441	1116
		CB_2^+				
CB_2^+	CB_2		10.2 ± 0.6	LE	418	2176
CB_2^+	CB_2		10.7	NS	430	1116
		C_2B^+				
C_2B^+	C_2B		10.4 ± 0.6	LE	423	2176
C_2B^+	C_2B		10.7	NS	430	1116
		$C_2H_5Li_2^+$				
$C_2H_5Li_2^+$	$(C_2H_5Li)_4$		11.7 ± 0.5	NS		1
		$C_4H_{10}Li_3^+$				
$C_4H_{10}Li_3^+$	$(C_2H_5Li)_4$		11.7 ± 0.5	NS		1
		$C_6H_{15}Li_4^+$				
$C_6H_{15}Li_4^+$	$(C_2H_5Li)_4$	C_2H_5	8.0 ± 0.5	NS		1
		$C_8H_{20}Li_5^+$				
$C_8H_{20}Li_5^+$	$(C_2H_5Li)_6$		12.5 ± 0.5	NS		1
		$C_{10}H_{25}Li_6^+$				
$C_{10}H_{25}Li_6^+$	$(C_2H_5Li)_6$	C_2H_5	7.7 ± 0.5	NS		1
		CH_3B^+				
CH_3B^+	$(CH_3)_3B$	$2CH_3$?	17.0 ± 0.5	SL	296	364
		$C_2H_6B^+$				
$C_2H_6B^+$	$(CH_3)_3B$	CH_3	10.3 ± 0.2	SL	175	364
		$C_3H_9B^+$				
$C_3H_9B^+$	$(CH_3)_3B$		8.8 ± 0.2	SL	173*	364
		$C_4H_{10}B^+$				
$C_4H_{10}B^+$	$(C_2H_5)_3B$	C_2H_5	9.6 ± 0.2	SL	159	364
		$C_6H_{15}B^+$				
$C_6H_{15}B^+$	$(C_2H_5)_3B$		9.0 ± 0.2	SL	170*	364
		$C_2H_{18}B_{10}^+$				
$C_2H_{18}B_{10}^+$	$C_2H_5B_{10}H_{13}$		9.0 ± 0.5	SL		103

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		N^+ Heat of formation 448 kcal mol^{-1}				
N^+	N		14.549	S	448*	2113
N^+	N		14.53 ± 0.12	SL	448	78
N^+	N		15	SL	459	154
N^+	N		14.8	CS	454	2
N^+	N		14.72 ± 0.26	LE	452	1133
N^+	N		16.1 ± 0.3	LE		1133
N^+	N_2	N	24.3 ± 0.2	PI	447	163
N^+	N_2	N	24.32 ± 0.02	RPD	448	49
N^+	N_2	$N(^2D)$	26.66 ± 0.05	RPD	447	49
N^+	N_2	$N(^2P)$	27.93 ± 0.05	RPD	449	49
N^+	N_2	N	24.60 ± 0.1	SL	454	364
N^+	N_2	N	23.5	SL	429	78
N^+	N_2	N	23.8 ± 0.5	LE	436	2021
N^+	N_2	$N(^2D)$	25.6 ± 0.5	LE	422	2021
N^+	N_2	$N(^2P)$	28.3 ± 0.2	LE	457	2021
N^+	NH_3	$H_2 + H$	22.6 ± 0.1	NS	458	132
N^+	NH_3	3H	26.65 ± 0.1	NS	447	132
$N^+(^1D)$	NH_3	$H_2 + H$	24.1 ± 0.1	NS	493	132
$N^+(^1D)$	NH_3	3H	28.6 ± 0.1	NS	492	132
N^+	HN_3	$N_2 + H$?	19.7 ± 0.3	SL	473	340
N^+	CNC≡CCN	$C_3 + CN$?	26.0 ± 1.0	SL	438	154
N^+	CNC≡CC≡CCN		19	SL		154
N^+	CNC≡CC≡CCN		26.8 ± 0.3	SL		154
N^+	NO	O^-	19.55 ± 0.04	RPD	448	328
N^+	NO	O^-	19.8 ± 0.2	FDP	454	1378
N^+	NO	O^-	19.573 ± 0.02	D	449	6
N^+	NO	O	21.8 ± 0.4	PI	465	163
N^+	NO	O	21.11 ± 0.04	RPD	449	328
N^+	NO	O	23.03 ± 0.04	RPD		328
N^+	NO	O	21.2 ± 0.5	LE	451	2021
N^+	NO	O	23.2 ± 0.5	LE		2021
N^+	NO		26.1 ± 0.5	LE		2021
N^+	NO	O^+	34.1 ± 0.7	LE	434	2021
N^+	N_2O	NO	20.0 ± 0.3	PI	459	163
N^+	N_2O	NO	20.1	RPD	462	2018
N^+	N_2O	NO	20.8	RPD		2018
N^+	N_2O	NO	21.8	RPD		2018
N^+	N_2O	NO	23.3	RPD		2018
N^+	NF_3	$F_2 + F$	22.2 ± 0.2	SL	463	401

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		N_2^+ ($X\,^2\Sigma_g^+$) Heat of formation 359 kcal mol^{-1}				
		N_2^+ ($A\,^2\Pi_u$) 385 kcal mol^{-1}				
		N_2^+ ($B\,^4\Sigma_u^+$) 432 kcal mol^{-1}				
		N_2^+ ($C\,^2\Sigma_u^+$) 544 kcal mol^{-1}				
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.576	S	359*	2100
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.56	PI	359	2033
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.6 ± 0.1	PI	360	163
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.57	PE	359	248
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.63 ± 0.02	RPD	360	1012
N_2^+ ($X\,^2\Sigma_g^+$)	N_2		15.56 ± 0.10	CS	359	383
N_2^+	N_2		15.7	EC	362	218
N_2^+ (Autoionization)	N_2		16.2 ± 0.1	RPD		1012
N_2^+ ($A\,^2\Pi_u$)	N_2		16.693	S	385*	2100
N_2^+ ($A\,^2\Pi_u$)	N_2		16.9 ± 0.3	PI	390	163
N_2^+ ($A\,^2\Pi_u$)	N_2		16.72	PE	386	248
N_2^+ ($A\,^2\Pi_u$)	N_2		17.00 ± 0.05	RPD	392	1012
N_2^+ ($B\,^2\Sigma_u^+$)	N_2		18.745	S	432*	2100
N_2^+ ($B\,^2\Sigma_u^+$)	N_2		18.8 ± 0.4	PI	434	163
N_2^+ ($B\,^2\Sigma_u^+$)	N_2		18.72	PE	432	248
N_2^+ ($B\,^2\Sigma_u^+$)	N_2		18.94 ± 0.06	RPD	437	1012
N_2^+	N_2		20.7 ± 0.4	PI		163
N_2^+ ($C\,^2\Sigma_u^+$)	N_2		23.575	S	544*	2100
N_2^+ ($A\,^2\Pi_u$)	N_2H_4	$2H_2$	16.2 ± 0.1	SL	396	424
N_2^+	HN_3	NH	16.0 ± 0.1	SL	(b)	340
N_2^+	$CH_3N_2H_3$	$CH_4 + H_2$	13.2 ± 0.3	SL	345	424
N_2^+ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$2CH_4$	13.2 ± 0.1	SL	360	424
N_2^+ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$2CH_4$	12.5 ± 0.2	SL	346	424
N_2^+	$(CH_3)_3N_2H$	$CH_4 + C_2H_6$	13.2 ± 0.2	SL	362	424
N_2^+	$(CH_3)_4N_2$	$2C_2H_6$	13.1 ± 0.2	SL	359	424
N_2^+	N_2O	O	17.4 ± 0.2	PI	361	163
		N_2^{+2}				
N_2^{+2}	N_2		43.5 ± 0.3	FDP	1003	212
		N_3^+				
N_3^+	HN_3	H	16.0 ± 0.2	SL	387	340
N_3^+	CH_3N_3	CH_3	17.6 ± 0.5	SL	430	340
		NH^+ Heat of formation 382 kcal mol^{-1}				
NH^+	NH		13.10 ± 0.05	NS	381*	132
NH^+	NH_3	H_2	17.1 ± 0.1	NS	383*	132
NH^+	NH_3	2H	21.6 ± 0.1	NS	383*	132
NH^+	HN_3	N_2	14.4 ± 0.2	SL	402	340
		NH_2^+ Heat of formation 304 kcal mol^{-1}				
NH_2^+	NH_2		11.4 ± 0.1	SL	304*	34
NH_2^+	NH_3	H	16.0 ± 0.1	SL	306*	34
NH_2^+	N_2H_4	NH_2	13.9 ± 0.4	SL	302*	34

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		NH_3^+ Heat of formation 223 kcal mol^{-1}				
NH_3^+	NH_3		10.19	S	224*	1070
NH_3^+	NH_3		11.0 ± 0.2	S	243	138
NH_3^+	NH_3		10.154 ± 0.01	PI	223*	159
NH_3^+	NH_3		10.15 ± 0.01	PI	223*	416, 182
NH_3^+	NH_3		10.07 ± 0.05	PI	221*	155
NH_3^+	NH_3		10.16	PE	223*	1130
NH_3^+	NH_3		10.40 ± 0.02	RPD	229	463
NH_3^+	NH_3		10.34 ± 0.07	SL	227	14
NH_3^+	NH_3		10.50 ± 0.09	SL	231	411
NH_3^+	NH_3		10.3	EC	227	218
NH_3^+	NH_3		9.94	TC	218	335
NH_3^+	NH_3		17.0 ± 0.5	S		138
NH_3^+	NH_3		15.02	PE		1130
NH_3^+ (^2E)	NH_3		15.31 ± 0.04	RPD	342	463
NH_3^+	NH_3		16.20	TC		335
		NH_3^{+2}				
NH_3^{+2}	NH_3		33.7 ± 0.2	FDP	766	212
NH_3^{+2}	NH_3		36.8	FDP		212
		N_2H^+				
N_2H^+	N_2H_4	$H_2 + H$	14.8 ± 0.3	SL	312	424
N_2H^+	HN_3	N	13.8 ± 0.2	SL	276	340
N_2H^+	$CH_3N_2H_3$	$CH_3 + H_2$?	13.3 ± 0.3	SL	296	424
		$N_2H_2^+$				
$N_2H_2^+$	N_2H_2		9.85 ± 0.1	SL		33, 34
$N_2H_2^+$	N_2H_4	H_2	10.98 ± 0.2	SL	276	33, 34
$N_2H_2^+$	N_2H_4	H_2	11.9 ± 0.2	SL	297	424
$N_2H_2^+$	N_2H_4	2H	16.6 ± 0.1	SL	301	424
$N_2H_2^+$	$CH_3N_2H_3$	CH_4	11.2 ± 0.2	SL	299	424
$N_2H_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	C_2H_6	8.6 ± 0.1	PI	238	1141
$N_2H_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$C_2H_4 + H_2$?	12.9 ± 0.1	SL	305	424
$N_2H_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	C_2H_6	11.0 ± 0.2	SL	296	424
$N_2H_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$C_2H_4 + H_2$?	13.0 ± 0.2	SL	309	424
$N_2H_2^+$	$(CH_3)_3N_2H$	$C_2H_4 + CH_4$	11.9 ± 1.0	SL	299	424
$N_2H_2^+$	$(CH_3)_4N_2$	$C_2H_6 + C_2H_4$	11.9 ± 0.2	SL	299	424
$N_2H_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$	*n*-C_5H_{12}	9.5 ± 0.2	PI	258	1141
$N_2H_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$	*n*-C_5H_{12}	11.1 ± 0.1	PI		1141

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$N_2H_3^+$				
$N_2H_3^+$	N_2H_3		7.88 ± 0.2	SL		34
$N_2H_3^+$	N_2H_4	H	10.6 ± 0.1	PI	215	1141
$N_2H_3^+$	N_2H_4	H	11.18 ± 0.1	SL	229	34
$N_2H_3^+$	N_2H_4	H	11.3 ± 0.1	SL	231	424
$N_2H_3^+$	N_2H_4	H	11.3	NS	231	1455
$N_2H_3^+$	$CH_3N_2H_3$	CH_3	9.5 ± 0.1	PI	208	1141
$N_2H_3^+$	$CH_3N_2H_3$	CH_3	10.7 ± 0.3	SL	236	424
$N_2H_3^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	C_2H_5	10.2 ± 0.2	SL	232	424
$N_2H_3^+$	$(CH_3)_3N_2H$	$C_2H_4 + CH_3$?	11.7 ± 1.0	SL	243	424
		$N_2H_4^+$ Heat of formation 224 kcal mol^{-1}				
$N_2H_4^+$	N_2H_4		9.56 ± 0.02	PI	243	1166
$N_2H_4^+$	N_2H_4		8.74 ± 0.06	PI	224*	1141
$N_2H_4^+$	N_2H_4		11.0 ± 0.1	PI		1141
$N_2H_4^+$	N_2H_4		8.74 ± 0.06	PI	224*	2173
$N_2H_4^+$	N_2H_4		9.00 ± 0.1	SL	230	424
$N_2H_4^+$	$(CH_3)_3N_2H$	$C_2H_2 + CH_4$	11.9 ± 0.2	SL	257	424
$N_2H_4^+$	$(CH_3)_4N_2$		12.3 ± 0.1	SL		424
		N_3H^+				
N_3H^+	HN_3		10.3 ± 0.2	SL	308*	340
		$N_3H_3^+$				
$N_3H_3^+$	N_3H_3		9.6 ± 0.1	SL		34
		CN^+ Heat of formation 430 kcal mol^{-1}				
CN^+	CN		14.5 ± 0.5	SL	434*	154
CN^+	CN		14.2 ± 0.3	NS	427*	2145
CN^+	C_2N_2	CN	21.5 ± 0.3	SL	470	154
CN^+	C_2N_2	CN	20.4 ± 0.3	NS	444	2145
CN^+	CNC≡CCN	C_3N	19.2 ± 0.3	SL		154
CN^+	CNC≡CC≡CCN	C_5N	20.0 ± 1.0	SL		154
CN^+	CH≡CCN	C_2H	19.8 ± 0.2	SL	436	154
CN^+ (Cyclopropyl cyanide)	C_3H_5CN	*cyclo*-C_3H_5	19.5 ± 0.4	EVD		202
CN^+	CNCl	Cl^-	15.5 ± 0.2	SL	449	73
CN^+	CNCl	Cl	18.3 ± 0.2	SL	426	73
CN^+	CNBr	Br^-	14.6 ± 0.1	SL	437	73
CN^+	CNBr	Br	18.3 ± 0.1	SL	440	73
CN^+	CNI	I	18.1 ± 0.1	SL	446	73
		C_2N^+				
C_2N^+	C_2N		13	SL		154
C_2N^+	C_2N_2	N	19.5 ± 0.1	SL	411	154
C_2N^+	CNC≡CCN	C_2N	18.1 ± 0.4	SL		154
C_2N^+	CNC≡CC≡CCN	C_4N	17.0 ± 0.1	SL		154
C_2N^+	CNC≡CC≡CCN		19.7 ± 0.5	SL		154
C_2N^+ (Ethylenimine)	C_2H_5N	$H_2 + 3H$?	23.0 ± 0.4	EVD	400	51
C_2N^+	CH≡CCN	CH?	18.0 ± 0.5	SL	364	154
C_2N^+	CH≡CCN	C + H	24.0 ± 0.5	SL	421	154

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_3N^+				
C_3N^+	C_3N		14.4	SL		154
C_3N^+	CNC≡CCN	CN	18.4 ± 0.2	SL	452	154
C_3N^+	CNC≡CC≡CCN	C_3N	22.0 ± 0.5	SL		154
C_3N^+	CH≡CCN	H	18.2 ± 0.3	SL	459	154
		C_4N^+				
C_4N^+	C_4N		11.9 ± 0.5	SL		154
C_4N^+	CNC≡CCN	N	18.8 ± 0.5	SL	449	154
C_4N^+	CNC≡CC≡CCN	C_2N	19.0 ± 1.0	SL		154
		C_5N^+				
C_5N^+	CNC≡CC≡CCN	CN	17.3 ± 0.2	SL	482	154
		C_6N^+				
C_6N^+	C_6N		12.2 ± 0.1	SL		154
C_6N^+	CNC≡CC≡CCN	N	19.2 ± 0.3	SL	513	154
		$C_2N_2^+$ Heat of formation 387 kcal mol^{-1}				
$C_2N_2^+$	C_2N_2		13.57 ± 0.02		387*	2114
$C_2N_2^+$	C_2N_2		13.6 ± 0.2	SL	387*	154
		$C_4N_2^+$				
$C_4N_2^+$	CNC≡CCN		11.4 ± 0.2	SL	391	154
		$C_6N_2^+$				
$C_6N_2^+$	CNC≡CC≡CCN		11.4 ± 0.2	SL	446	154
		CHN^+ Heat of formation 351 kcal mol^{-1}				
CHN^+	HCN		13.73 ± 0.09	SL	349*	411
CHN^+	HCN		13.91 ± 0.04	CS	353*	282
CHN^+	CH_3N_3	$H_2 + N_2$	13.6 ± 0.5	SL	371	340
		CH_2N^+				
CH_2N^+ (Azetidine)	$(CH_2)_3NH$	$C_2H_4 + H$	13.1 ± 0.2	EVD	253	52
CH_2N^+ (Pyrrolidine)	$(CH_2)_4NH$	$C_3H_6 + H$	13.9 ± 0.2	EVD	262	52
CH_2N^+	CH_3N_3	$H + N_2$	10.5 ± 0.1	SL	247	340
		CH_4N^+ Heat of formation 178 kcal mol^{-1}				
CH_4N^+	$C_2H_5NH_2$	CH_3	9.71	PI	179*	11
CH_4N^+ (Azetidine)	$(CH_2)_3NH$	$C_2H_2 + H$	12.3 ± 0.2	EVD	193	52
CH_4N^+	n-$C_3H_7NH_2$	C_2H_5	9.54	PI	178*	11
CH_4N^+ (Pyrrolidine)	$(CH_2)_4NH$	$C_3H_4 + H$	12.7 ± 0.2	EVD	193	52
CH_4N^+	CH_2NH_2COOH	COOH	10.1 ± 0.2	LE	175	88
		$CH_2D_2N^+$				
$CH_2D_2N^+$ (N,N-d_2-Benzylamine)	$C_6H_5CH_2ND_2$	C_6H_5	11.0 ± 0.1	PI		1160

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_5N^+ Heat of formation 201 kcal mol^{-1}						
CH_5N^+	CH_3NH_2		8.97 ± 0.02	PI	201*	159,
CH_5N^+	CH_3NH_2		9.18	PE	206	416, 182
CH_5N^+	CH_3NH_2		12.16	PE		1130
CH_5N^+	CH_3NH_2		13.94?	PE		1130
CH_5N^+	CH_3NH_2		15.07	PE		1130
CH_5N^+	CH_3NH_2		16.57	PE		1130
CH_5N^+	CH_3NH_2		19.89?	PE		1130
CH_5N^+	CH_3NH_2		9.45 ± 0.08	RPD	212	1072
CH_5N^+	CH_3NH_2		12.35 ± 0.10	RPD		1072
CH_5N^+	CH_3NH_2		13.90 ± 0.30	RPD		1072
CH_5N^+	CH_3NH_2		17.70 ± 0.70	RPD		1072
CH_5N^+	CH_3NH_2		21.75 ± 0.20	RPD		1072
CH_5N^+	CH_3NH_2		23.75 ± 0.70	RPD		1072
CH_5N^+	CH_3NH_2		9.41 ± 0.08	SL	212	14
CH_5N^+	CH_3NH_2		9.27 ± 0.1	SL	208	67
CH_5N^+	CH_3NH_2		9.41 ± 0.02	CS	212	383, 384
CH_5N^+	CH_3NH_2		9.56	TC	215	136
CH_5N^+	$CH_3N_2H_3$	NH	11.3 ± 0.1	PI	204	1141
C_2HN^+						
C_2HN^+ (Ethylenimine)	C_2H_5N	$2H_2$	18.1 ± 0.6	EVD	443	51
$C_2H_2N^+$ Heat of formation 298 kcal mol^{-1}						
$C_2H_2N^+$	CH_2CN		10.87 ± 0.1	SL	(a)	125
$C_2H_2N^+$	CH_2CN		10.86 ± 0.2	SL	(a)	125
$C_2H_2N^+$	CH_2CN		10.95 ± 0.2	SL	(a)	125
$C_2H_2N^+$	CH_3CN	H	14.28 ± 0.05	SL	298*	125
$C_2H_2N^+$ (Ethylenimine)	C_2H_5N		17.0 ± 0.2	EVD		51
CH_3CN^+ Heat of formation 302 kcal mol^{-1}						
$C_2H_3N^+$	CH_3CN		12.205 ± 0.004	PI	302*	1253
$C_2H_3N^+$	CH_3CN		12.22 ± 0.01	PI	303*	182
$C_2H_3N^+$	CH_3CN		12.34 ± 0.04	RPD	305	286
$C_2H_3N^+$	CH_3CN		12.96 ± 0.03	RPD		286
$C_2H_3N^+$	CH_3CN		13.92 ± 0.04	RPD		286
$C_2H_3N^+$	CH_3CN		12.42 ± 0.09	SL	307	411
$C_2H_3N^+$	CH_3CN		12.3 ± 0.1	EC	305	2171
$C_2H_3N^+$	CH_3NC		11.8 ± 0.1	EC	308	2171
$C_2H_3N^+$ (Ethylenimine)	C_2H_5N	H_2	15.2 ± 0.3	EVD	377	51
$C_2H_4N^+$						
$C_2H_4N^+$ (Ethylenimine)	C_2H_5N	H	12.2 ± 0.1	EVD	255	51
$C_2H_4N^+$ (Azetidine)	$(CH_2)_3NH$	CH_3	11.9 ± 0.2	EVD	257	52
$C_2H_4N^+$ (Pyrrolidine)	$(CH_2)_4NH$	C_2H_5	13.0 ± 0.2	EVD	273	52
$C_2H_4N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$NH_2 + H_2$?	12.8 ± 0.2	SL	274	424
$C_2H_4N^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$NH_2 + H_2$?	12.1 ± 0.5	SL	260	424
$C_2H_4N^+$	$(CH_3)_3N_2H$	$NH_2 + CH_4$	11.7 ± 0.2	SL	266	424
$C_2H_4N^+$	$(CH_3)_4N_2$	$NH_2 + C_2H_6$?	12.2 ± 0.2	SL	277	424

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$cyclo$-$C_2H_5N^+$ Heat of formation 255 kcal mol^{-1}						
$C_2H_5N^+$ (Ethylenimine)	C_2H_5N		9.94 ± 0.15	EVD	255*	51
$C_2H_5N^+$ (Ethylenimine)	C_2H_5N		9.8	EC	252	218
$C_2H_5N^+$ (Ethylenimine)	C_2H_5N		8.24	TC	216	2184
$C_2H_5N^+$ (Pyrrolidine)	$(CH_2)_4NH$	C_2H_4	12.3 ± 0.2	EVD	269	52
$C_2H_5N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		8.8 ± 0.1	PI		1141
$C_2H_5N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		10.9 ± 0.2	PI		1141
$C_2H_5N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		12.5 ± 0.2	SL		424
$C_2H_6N^+$						
$C_2H_6N^+$	$(CH_3)_3N$	CH_3	12.3 ± 0.1	NS	245	303
$C_2H_6N^+$ (1,1-Dimethyldrazine)	$(CH_3)_2N_2H_2$	NH_2	9.0 ± 0.2	PI	186	1141
$C_2H_6N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	NH_2	11.2 ± 0.2	PI		1141
$C_2H_6N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	NH_2	10.9 ± 0.2	SL	230	424
$C_2H_6N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	NH_2	10.7 ± 0.1	NS	225	303
$C_2H_6N^+$	$(CH_3)_3N_2H$	CH_3NH	11.1 ± 0.2	SL		424
$C_2H_6N^+$	$(CH_3)_4N_2$	$(CH_3)_2N$	11.2 ± 0.2	SL		424
$C_2H_6N^+$	$(CH_3)_4N_2$	$(CH_3)_2N$	11.2 ± 0.1	NS	241	303
$C_2H_6N^+$	$(CH_3)_2NN{=}NN(CH_3)_2$		9.85 ± 0.1	NS		303
$C_2H_6N^+$	$(CH_3)_2NCHO$		11.6 ± 0.1	NS		303
$C_6H_6N^+$	$(CH_3)_2NCOCH_3$		12.4 ± 0.1	NS		303
$C_2H_6N^+$	$(CH_3)_2NNO$	NO	10.9 ± 0.1	NS	244	303
$C_2H_6N^+$	$(CH_3)_2NNO_2$	NO_2	11.1 ± 0.1	NS	282	303
$C_2H_5NH_2^+$ Heat of formation 193 kcal mol^{-1}						
$(CH_3)_2NH^+$ 186 kcal mol^{-1}						
$C_2H_7N^+$	$C_2H_5NH_2$		8.86 ± 0.02	PI	193*	159, 182
$C_2H_7N^+$	$C_2H_5NH_2$		8.8	PI	192	86
$C_2H_7N^+$	$C_2H_5NH_2$		8.9	PI	194	11
$C_2H_7N^+$	$C_2H_5NH_2$		9.19	PE	201	1130
$C_2H_7N^+$	$C_2H_5NH_2$		11.86	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		12.66	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		14.65	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		15.55	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		16.81	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		19.71	PE		1130
$C_2H_7N^+$	$C_2H_5NH_2$		9.19 ± 0.05	SL	201	14
$C_2H_7N^+$	$(CH_3)_2NH$		8.24 ± 0.02	PI	186*	159, 182
$C_2H_7N^+$	$(CH_3)_2NH$		8.36	PE	188	1130
$C_2H_7N^+$	$(CH_3)_2NH$		12.88	PE		1130
$C_2H_7N^+$	$(CH_3)_2NH$		14.63	PE		1130
$C_2H_7N^+$	$(CH_3)_2NH$		16.35	PE		1130
$C_2H_7N^+$	$(CH_3)_2NH$		19.62?	PE		1130
$C_2H_7N^+$	$(CH_3)_2NH$		8.93 ± 0.03	SL	201	14
$C_2H_7N^+$	$(CH_3)_2NH$		9.21 ± 0.05	CS	208	384
$C_2H_7N^+$	$(CH_3)_2NH$		9.01	TC	203	136
$C_2H_7N^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	NH	11.2 ± 0.2	PI	199	1141

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_3HN^+				
C_3HN^+	CH≡CCN		11.6 ± 0.2	SL	358	154
		C_3HN^{+2}				
C_3HN^{+2}	CH≡CCN		32.3 ± 0.2	SL	836	154
		$C_3H_2N^+$				
$C_3H_2N^+$	CH_2=CHCN	H	13.82 ± 0.08	EVD	311	1406
$C_3H_2N^+$	$C_4H_4N_2$	HCN + H	15.01 ± 0.10	EVD	309	1406
$C_3H_2N^+$ (Metadiazine)						
$C_3H_2N^+$	$C_4H_4N_2$	HCN + H	15.25 ± 0.10	EVD	314	1406
$C_3H_2N^+$ (Paradiazine)						
		CH_2=CHCN$^+$ Heat of formation 296 kcal mol^{-1}				
$C_3H_3N^+$	CH_2=CHCN		10.91 ± 01	PI	296*	182
$C_3H_3N^+$	CH_2=CHCN		11.10 ± 0.05	EVD	301	1406
$C_3H_3N^+$	C_5H_5N	C_2H_2	13.84 ± 0.10	EVD	299	1406
$C_3H_3N^+$ (Pyridine)						
$C_3H_3N^+$	$C_4H_4N_2$	HCN	12.87 ± 0.10	EVD	311	1406
$C_3H_3N^+$ (Metadiazine)						
$C_3H_3N^+$	$C_4H_4N_2$	HCN	12.81 ± 0.10	EVD	310	1406
$C_3H_3N^+$ (Paradiazine)						
		$C_3H_4N^+$				
$C_3H_4N^+$	CH_3CHCN		9.76 ± 0.1	SL		125
$C_3H_4N^+$	CH_2CH_2CN		9.85 ± 0.1	SL		125
		$C_3H_5N^+$				
$C_3H_5N^+$	C_2H_5CN		11.84 ± 0.02	PI	289*	182
$C_3H_5N^+$	C_2H_5CN		11.9 ± 0.1	EC	290	2171
$C_3H_5N^+$	C_2H_5NC		11.2 ± 0.1	EC	289	2171
		$C_3H_6N^+$				
$C_3H_6N^+$ (Azetidine)	$(CH_2)_3NH$	H	11.4 ± 0.2	EVD	226	52
		$C_3H_7N^+$				
$C_3H_7N^+$ (Azetidine)	$(CH_2)_3NH$		9.1 ± 0.15	EVD	225*	52
$C_3H_7N^+$ (Azetidine)	$(CH_2)_3NH$		8.9	EC	221	218
$C_3H_7N^+$ (Azetidine)	$(CH_2)_3NH$		8.07	TC	202	2184
		***n*-$C_3H_7NH_2^+$ Heat of formation 185 kcal mol^{-1}**				
		***iso*-$C_3H_7NH_2^+$ 183 kcal mol^{-1}**				
		$(CH_3)_3N^+$ 175 kcal mol^{-1}				
$C_3H_9N^+$	*n*-$C_3H_7NH_2$		8.78 ± 0.02	PI	185*	159, 182
$C_3H_9N^+$	*n*-$C_3H_7NH_2$		8.7	PI	183	86
$C_3H_9N^+$	*n*-$C_3H_7NH_2$		8.8	PI	186	11

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		8.72 ± 0.03	PI	183*	159, 182
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		8.86	PE	186	1130
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		11.23	PE		1130
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		14.87	PE		1130
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		16.41?	PE		1130
$C_3H_9N^+$	*iso*-$C_3H_7NH_2$		19.09?	PE		1130
$C_3H_9N^+$	$(CH_3)_3N$		7.82 ± 0.02	PI	175*	159, 416, 182
$C_3H_9N^+$	$(CH_3)_3N$		8.12	PE	181	1130
$C_3H_9N^+$	$(CH_3)_3N$		11.63	PE		1130
$C_3H_9N^+$	$(CH_3)_3N$		13.52	PE		1130
$C_3H_9N^+$	$(CH_3)_3N$		15.31	PE		1130
$C_3H_9N^+$	$(CH_3)_3N$		19.34?	PE		1130
$C_3H_9N^+$	$(CH_3)_3N$		8.32 ± 0.02	SL	186	14
$C_3H_9N^+$	$(CH_3)_3N$		9.02 ± 0.05	CS	202	384
$C_3H_9N^+$	$(CH_3)_3N$		8.66	TC	194	136
		$C_4H_4N^+$				
$C_4H_4N^+$ (Aniline)	$C_6H_5NH_2$	C_2H_3?	12.3 ± 0.1	PI	243	1160
		$CH_2{=}CHCH_2CN^+$ Heat of formation 281 kcal mol^{-1}				
		$C_4H_5N^+$ (Pyrrole) 215 kcal mol^{-1}				
$C_4H_5N^+$	$CH_2{=}CHCH_2CN$		10.39 ± 0.01	PI	281*	182
$C_4H_5N^+$ (Cyclopropyl cyanide)	C_3H_5CN		11.2 ± 0.2	EVD	301	202
$C_4H_5N^+$ (Pyrrole)	C_4H_5N		8.20 ± 0.01	PI	215*	182
$C_4H_5N^+$ (Pyrrole)	C_4H_5N		8.97 ± 0.05	CS	233	381
$C_4H_5N^+$ (Pyrrole)	C_4H_5N		8.61	TC	224	136
		$C_4H_6N^+$				
$C_4H_6N^+$	$(CH_3)_2CCN$		9.15 ± 0.1	SL	239*	125
		$C_4H_7N^+$				
$C_4H_7N^+$	*n*-C_3H_7CN		11.67 ± 0.05	PI	280*	182
$C_4H_7N^+$	*n*-C_3H_7NC		11.1 ± 0.1	EC	282	2171
		$C_4H_8N^+$				
$C_4H_8N^+$ (Pyrrolidine)	$(CH_2)_4NH$	H	11.0 ± 0.2	EVD	200	52
		$C_4H_9N^+$ (Pyrrolidine) Heat of formation 192 kcal mol^{-1}				
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		9.29	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		10.57	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		11.63	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		12.55	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		14.36	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		15.63	PE		1130
$C_4H_9N^+$	$CH_3CH{=}NC_2H_5$		19.73?	PE		1130

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		8.41	PE	192*	1130
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		11.10	PE		1130
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		14.13	PE		1130
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		16.64	PE		1130
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		18.62	PE		1130
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		9.0 ± 0.15	EVD	206	52
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		8.9	EC	203	218
$C_4H_9N^+$ (Pyrrolidine)	$(CH_2)_4NH$		7.98	TC	182	2184
		***n*-$C_4H_9NH_2^+$ Heat of formation**			**179 kcal mol^{-1}**	
		***sec*-$C_4H_9NH_2^+$**			**177 kcal mol^{-1}**	
		***iso*-$C_4H_9NH_2^+$**			**177 kcal mol^{-1}**	
		***tert*-$C_4H_9NH_2^+$**			**173 kcal mol^{-1}**	
		$(C_2H_5)_2NH^+$			**163 kcal mol^{-1}**	
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		8.71 ± 0.03	PI	179*	159, 182
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		8.79	PE	181	1130
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		10.75	PE		1130
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		14.11?	PE		1130
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		15.28	PE		1130
$C_4H_{11}N^+$	*n*-$C_4H_9NH_2$		19.35?	PE		1130
$C_4H_{11}N^+$	*sec*-$C_4H_9NH_2$		8.70	PI	177*	182
$C_4H_{11}N^+$	*iso*-$C_4H_9NH_2$		8.70	PI	177*	182
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		8.64	PI	173*	182
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		8.83	PE	177	1130
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		9.81	PE		1130
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		12.46	PE		1130
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		15.11	PE		1130
$C_4H_{11}N^+$	*tert*-$C_4H_9NH_2$		19.46?	PE		1130
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		8.01 ± 0.01	PI	163*	159, 182
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		8.51	PE	175	1130
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		11.08	PE		1130
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		14.45	PE		1130
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		19.18?	PE		1130
$C_4H_{11}N^+$	$(C_2H_5)_2NH$		8.44 ± 0.01	SL	173	14
$C_4H_{11}N^+$ (1,1-Dimethylhydrazine)	$(C_2H_5)_2N_2H_2$	NH	11.2 ± 0.1	PI	188	1141
		$C_5H_3N^+$				
$C_5H_3N^+$ (Pyridine)	C_5H_5N	H_2	12.42 ± 0.10	EVD	320	1406
		$C_5H_4N^+$				
$C_5H_4N^+$ (Pyridine)	C_5H_5N	H	14.00 ± 0.10	EVD	304	1406

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_2D_2N^+$				
$C_5H_2D_2N^+$ (N,N-d_2-Benzylamine)	$C_6H_5CH_2ND_2$	C_2H_5?	11.0 ± 0.2	PI		1160
		$C_5H_5N^+$ (Pyridine) Heat of formation 247 kcal mol^{-1}				
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.266	S	247*	1115
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.23 ± 0.03	PI	246*	416, 182
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.20 ± 0.05	PI	246*	1160
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.28	PE	248	1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.45 ± 0.05	EVD	251	1406
$C_5H_5N^+$ (Pyridine)	C_5H_5N		10.06 ± 0.05	EVD	266	1406
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.85 ± 0.05	SL	261	217
$C_5H_5N^+$ (Pyridine)	C_5H_5N		9.76 ± 0.05	CS	259	383
$C_5H_5N^+$ (Pyridine)	C_5H_5N		10.3	S		1115
$C_5H_5N^+$ (Pyridine)	C_5H_5N		10.30 ± 0.05	PI		1160
$C_5H_5N^+$ (Pyridine)	C_5H_5N		10.54	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		11.56	S		1115
$C_5H_5N^+$ (Pyridine)	C_5H_5N		11.05 ± 0.1	PI		1160
$C_5H_5N^+$ (Pyridine)	C_5H_5N		12.22	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		13.43?	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		14.44	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		15.49	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		16.94	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		19.39?	PE		1130
$C_5H_5N^+$ (Pyridine)	C_5H_5N		20.14?	PE		1130
		$C_5H_6N^+$				
$C_5H_6N^+$ (Aminocyclopentadienyl radical)	$C_5H_4NH_2$		7.55	SL		126

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_{11}N^+$				
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		8.83	PE		1130
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		9.79	PE		1130
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		11.63	PE		1130
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		14.08	PE		1130
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		15.16	PE		1130
$C_5H_{11}N^+$	$(CH_3)_2C{=}NC_2H_5$		19.50?	PE		1130
$C_5H_{11}N^+$ (Piperidine)	$(CH_2)_5NH$		8.7	EC	191	218
$C_5H_{11}N^+$ (Piperidine)	$(CH_2)_5NH$		9.15	CTS	201	2031
$C_5H_{11}N^+$ (Piperidine)	$(CH_2)_5NH$		7.85	TC	171	2184
		$C_5H_{12}N^+$				
$C_5H_{12}N^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$	NH_2	9.0 ± 0.1	PI	171	1141
$C_5H_{12}N^+$ (Isoleucine)	*sec*-$C_4H_9CH(NH_2)COOH$	COOH	9.9 ± 0.2	LE	150	88
		$C_5H_{13}N^+$				
$C_5H_{13}N^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$	NH	10.5 ± 0.1	PI	167	1141
		$C_6H_4N^+$				
$C_6H_4H^+$ (Cyanocyclopentadienyl radical)	C_5H_4CN		9.44	SL	267*	126
		$C_6H_6N^+$				
$C_6H_6N^+$ (Anilino radical)	C_6H_5NH		8.26 ± 0.1	SL		1011
$C_6H_6N^+$ (2-Pyridylmethyl radical)	$C_5H_4NCH_2$		8.17 ± 0.1	SL	(a)	1011
$C_6H_6N^+$ (3-Pyridylmethyl radical)	$C_5H_4NCH_2$		7.92 ± 0.1	SL	(a)	1011
$C_6H_6N^+$ (4-Pyridylmethyl radical)	$C_5H_4NCH_2$		8.40 ± 0.15	SL	(a)	1011
$C_6H_6N^+$ (2-picoline)	$C_5H_4NCH_3$	H	12.38 ± 0.1	SL	258	1011
$C_6H_6N^+$ (3-picoline)	$C_5H_4NCH_3$	H	12.31 ± 0.1	SL	259	1011
$C_6H_6N^+$ (4-picoline)	$C_5H_4NCH_3$	H	12.22 ± 0.1	SL	254	1011

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
	$C_6H_7N^+$ (Aniline) Heat of formation 202 kcal mol^{-1}					
	$C_6H_7N^+$ (2-Picoline) 232 kcal mol^{-1}					
	$C_6H_7N^+$ (3-Picoline) 236 kcal mol^{-1}					
	$C_6H_7N^+$ (4-Picoline) 233 kcal mol^{-1}					
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		7.69 ± 0.02	PI	202*	1166
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		7.70 ± 0.02	PI	202*	182, 159, 416
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		7.67 ± 0.03	PI	202*	1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.8 ± 0.1	PI		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		10.2 ± 0.1	PI		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		11.8 ± 0.1	PI		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		12.6 ± 0.1	PI		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		7.69	PI	202*	1159
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.89 ± 0.1	PE		1159
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		9.2 ± 0.1	PE		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		10.3 ± 0.2	PE		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.32	SL	217	1066
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		7.76	CTS	204	1281
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.18	TC	213	1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.26	TC	215	1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		9.1	TC		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		9.2	TC		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		10.0	TC		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		10.2	TC		1160
$C_6H_7N^+$ (Aniline)	$C_6H_5NH_2$		8.58	TC	223	136
$C_6H_7N^+$ (2-Picoline)	$C_5H_4NCH_3$		9.02 ± 0.03	PI	232*	182
$C_6H_7N^+$ (2-Picoline)	$C_5H_4NCH_3$		9.56 ± 0.05	SL	245	217
$C_6H_7N^+$ (3-Picoline)	$C_5H_4NCH_3$		9.04 ± 0.03	PI	236*	182
$C_6H_7N^+$ (4-Picoline)	$C_5H_4NCH_3$		9.04 ± 0.03	PI	233*	182
$C_6H_7N^+$ (4-Picoline)	$C_5H_4NCH_3$		9.67 ± 0.05	SL	247	217
$C_6H_7N^+$ (Acetanilide)	$C_6H_5NHCOCH_3$		8.88 ± 0.15	SL		1126

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_{13}N^+$ (Cyclohexylamine) Heat of formation 181 kcal mol^{-1}						
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		9.00	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		10.15	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		11.15	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		12.59?	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		13.37	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		15.34	PE		1130
$C_6H_{13}N^+$	n-$C_3H_7CH{=}NC_2H_5$		19.17?	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		8.94	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		10.12	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		11.08	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		12.54	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		13.28	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		14.59	PE		1130
$C_6H_{13}N^+$	iso-$C_3H_7CH{=}NC_2H_5$		19.17?	PE		1130
$C_6H_{13}N^+$ (Cyclohexylamine)	$C_6H_{11}NH_2$		8.86	PE	181*	1130
$C_6H_{13}N^+$ (Cyclohexylamine)	$C_6H_{11}NH_2$		10.25	PE		1130
$C_6H_{13}N^+$ (Cyclohexylamine)	$C_6H_{11}NH_2$		14.56	PE		1130
$C_6H_{13}N^+$ (Cyclohexylamine)	$C_6H_{11}NH_2$		18.17	PE		1130
$C_6H_{13}N^+$ (Hexamethylenimine)	$(CH_2)_6NH$		8.5	EC	184	218
$(n$-$C_3H_7)_2NH^+$ Heat of formation 153 kcal mol^{-1}						
$(iso$-$C_3H_7)_2NH^+$ 148 kcal mol^{-1}						
$(C_2H_5)_3N^+$ 147 kcal mol^{-1}						
$C_6H_{15}N^+$	$(n$-$C_3H_7)_2NH$		7.84 ± 0.02	PI	153*	159, 182
$C_6H_{15}N^+$	$(iso$-$C_3H_7)_2NH$		7.73 ± 0.03	PI	148*	159, 182
$C_6H_{15}N^+$	$(C_2H_5)_3N$		7.50 ± 0.02	PI	147*	159, 182
$C_6H_{15}N^+$	$(C_2H_5)_3N$		7.84	PE	155	1130
$C_6H_{15}N^+$	$(C_2H_5)_3N$		10.79	PE		1130
$C_6H_{15}N^+$	$(C_2H_5)_3N$		14.36	PE		1130
$C_6H_{15}N^+$	$(C_2H_5)_3N$		15.37	PE		1130
$C_6H_{15}N^+$	$(C_2H_5)_3N$		19.92?	PE		1130
$C_6H_{15}N^+$	$(C_2H_5)_3N$		7.68 ± 0.1	RPD	151	2158
$C_6H_{15}N^+$	$(C_2H_5)_3N$		8.18 ± 0.1	RPD		2158
$C_6H_{15}N^+$	$(C_2H_5)_3N$		8.55 ± 0.1	RPD		2158
$C_6H_{15}N^+$	$(C_2H_5)_3N$		8.95 ± 0.1	RPD		2158
$C_6H_{15}N^+$	$(C_2H_5)_3N$		9.40 ± 0.1	RPD		2158
$C_6H_{15}N^+$	$(C_2H_5)_3N$		7.85 ± 0.07	SL	155	14
$C_6H_{15}N^+$	$(C_2H_5)_3N$		9.35	CTS	190	2031
***cyclo*-$C_6H_5CN^+$ Heat of formation 277 kcal mol^{-1}**						
$C_7H_5N^+$ (Benzonitrile)	C_6H_5CN		9.705 ± 0.01	PI	277*	182
$C_7H_5N^+$ (Benzonitrile)	C_6H_5CN		10.09	SL	286	1066
$C_7H_5N^+$ (Benzamide)	$C_6H_5CONH_2$	H_2O	10.19 ± 0.10	SL	271	1126
$C_7H_5N^+$ (3,5-Diphenyl-1,2,4-oxidiazole)	$(C_6H_5)_2C_2N_2O$	C_6H_5NCO	10.2 ± 0.1	SL		1125

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_7N^+$				
$C_7H_7N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$	H_2	9.35 ± 0.07	PI	236*	1147
		$C_7H_8N^+$				
$C_7H_8N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$	H	9.21 ± 0.07	PI	180*	1147
$C_7H_8N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$	H	9.3 ± 0.1	PI	182*	1160
$C_7H_8N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$	H	11.65 ± 0.1	PI		1160
$C_7H_8N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$	H	11.0 ± 0.1	PI	226*	1160
		$C_7H_9N^+$ (*N*-Methylaniline) Heat of formation 192 kcal mol^{-1}				
		$C_7H_9N^+$ (*m*-Toluidine) 189 kcal mol^{-1}				
		$C_7H_9N^+$ (Lutidine) 218 kcal mol^{-1}				
$C_7H_9N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$		7.56 ± 0.02	PI	194	159
$C_7H_9N^+$ (Benzylamine)	$C_6H_5CH_2NH_2$		8.64 ± 0.02	PI	219	1166, 1160
$C_7H_9H^+$ (Benzylamine)	$C_6H_5CH_2NH_2$		9.03 ± 0.05	CS	228	2025
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		7.34 ± 0.02	PI	193*	1166, 1159
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		7.30 ± 0.05	PI	192*	1160
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		8.55 ± 0.05	PI		1160
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		10.0 ± 0.1	PI		1160
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		8.44 ± 0.1	PE		1159
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		9.0 ± 0.1	PE		1160
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		10.0 ± 0.2	PE		1160
$C_7H_9N^+$ (*N*-Methylaniline)	$C_6H_5NHCH_3$		7.58	CTS	199	1281
$C_7H_9N^+$ (*o*-Toluidine)	$C_6H_4CH_3NH_2$		8.38	SL	210	1066
$C_7H_9N^+$ (*m*-Toluidine)	$C_6H_4CH_3NH_2$		7.50 ± 0.02	PI	189*	1166
$C_7H_9N^+$ (*m*-Toluidine)	$C_6H_4CH_3NH_2$		8.27	SL	207	1066
$C_7H_9N^+$ (*m*-Toluidine)	$C_6H_4CH_3NH_2$		7.85 ± 0.05	CS	197	2025
$C_7H_9N^+$ (*p*-Toluidine)	$C_6H_4CH_3NH_2$		8.14	SL	204	1066
$C_7H_9N^+$ (Toluidine)	$C_6H_4CH_3NH_2$		8.16	TC	204	2194
$C_7H_9N^+$ (2,3-Lutidine)	$C_5H_3N(CH_3)_2$		8.85 ± 0.02	PI	218*	182
$C_7H_9N^+$ (2,4-Lutidine)	$C_5H_3N(CH_3)_2$		8.85 ± 0.03	PI	218*	182
$C_7H_9N^+$ (2,6-Lutidine)	$C_5H_3N(CH_3)_2$		8.85 ± 0.02	PI	218*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_6N^+$				
$C_8H_6N^+$	$C_6H_4CNCH_2$		8.58 ± 0.1	SL	267	69
(m-Cyanobenzyl radical)						
$C_8H_6N^+$	$C_6H_4CNCH_2$		8.36 ± 0.1	SL	262	69
(p-Cyanobenzyl radical)						
		$C_8H_7N^+$				
$C_8H_7N^+$	$C_6H_5CH_2CN$		9.40 ± 0.05	CS	259*	2025
(Benzyl cyanide)						
$C_8H_7N^+$	$C_6H_4CH_3CN$		9.66 ± 0.05	CS	271*	2025
(m-Tolunitrile)						
$C_8H_7N^+$	$C_6H_4CH_3CN$		9.76	SL	273*	1066
(p-Tolunitrile)						
$C_8H_7N^+$	$C_6H_4CH_3CN$		9.64	TC	270	2194
(Tolunitrile)						
$C_8H_7N^+$	C_8H_7N		7.27	TC		136
(Pyrrocoline)						
		$C_8H_{10}N^+$				
$C_8H_{10}N^+$	$C_6H_5N(CH_3)_2$	H	10.75 ± 0.05	PI	217*	1160
(N,N-Dimethylaniline)						
		***cyclo*-$C_6H_5NHC_2H_5^+$ Heat of formation 193 kcal mol^{-1}**				
		***cyclo*-$C_6H_5N(CH_3)_2^+$ 185 kcal mol^{-1}**				
$C_8H_{11}N^+$	$C_6H_5NHC_2H_5$		7.56	CTS	193*	1281
(N-Ethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		7.14 ± 0.03	PI	186*	1166, 1159
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		7.10 ± 0.05	PI	185*	1160
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		7.75 ± 0.05	PI		1160
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		8.6 ± 0.1	PI		1160
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		9.8 ± 0.1	PI		1160
(N,N-Dimethylaniline)						
$C_8H_{11}N_+$	$C_6H_5N(CH_3)_2$		8.14 ± 0.1	PE		1159
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		8.5 ± 0.1	PE		1160
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		9.7 ± 0.2	PE		1160
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		7.44	CTS	193	1281
(N,N-Dimethylaniline)						
$C_8H_{11}N^+$	$C_6H_5N(CH_3)_2$		7.2	CTS	187	2037
(N,N-Dimethylaniline)						
		$C_8H_{19}N^+$				
$C_8H_{19}N^+$	$(n\text{-}C_4H_9)_2NH$		7.69 ± 0.03	PI	140*	159, 182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_9H_{13}N^+$				
$C_9H_{13}N^+$ (*N*-*n*-Propylaniline)	$C_6H_5NHC_3H_7$		7.54	CTS	188*	1281
$C_9H_{13}N^+$ (*N*-Ethyl-*N*-methylaniline)	$C_6H_5N(CH_3)C_2H_5$		7.37	CTS	185*	1281
$C_9H_{13}N^+$ (*N*,*N*-Dimethyl-*o*-toluidine)	$C_6H_4N(CH_3)_2CH_3$		7.37	CTS	184*	1281
$C_9H_{13}N^+$ (*N*,*N*-Dimethyl-*m*-toluidine)	$C_6H_4N(CH_3)_2CH_3$		7.35	CTS	181*	1281
$C_9H_{13}N^+$ (*N*,*N*-Dimethyl-*p*-toluidine)	$C_6H_4N(CH_3)_2CH_3$		7.33	CTS	181*	1281
		$C_9H_{21}N^+$				
$C_9H_{21}N^+$	$(n\text{-}C_3H_7)_3N$		7.23	PI	207*	159, 182
		$C_{10}H_{15}N^+$				
$C_{10}H_{15}N^+$ (*N*-*n*-Butylaniline)	$C_6H_5NHC_4H_9$		7.53	CTS	183*	1281
$C_{10}H_{15}N^+$ (*N*,*N*-Diethylaniline)	$C_6H_5N(C_2H_5)_2$		6.99	CTS	172*	1281
$C_{10}H_{15}N^+$ (*N*,*N*-Dimethyl-*p*-ethylaniline)	$C_6H_4N(CH_3)_2C_2H_5$		7.38	CTS	177*	1281
$C_{10}H_{15}N^+$ (*N*,*N*,2,4-Tetramethylaniline)	$C_6H_3N(CH_3)_4$		7.17	CTS	171*	1281
$C_{10}H_{15}N^+$ (*N*,*N*,2,6-Tetramethylaniline)	$C_6H_3N(CH_3)_4$		7.22	CTS	173*	1281
$C_{10}H_{15}N^+$ (*N*,*N*,3,5-Tetramethylaniline)	$C_6H_3N(CH_3)_4$		7.25	CTS	172*	1281
		$C_{11}H_{17}H^+$				
$C_{11}H_{17}N^+$ (*N*,*N*-Diethyl-*p*-toluidine)	$C_6H_4N(C_2H_5)_2CH_3$		6.93	CTS	164*	1281
$C_{11}H_{17}N^+$ (*N*,*N*-Dimethyl-*p*-isopropylaniline)	$C_6H_4N(CH_3)_2C_3H_7$		7.41	CTS	174*	1281
		$C_{12}H_{11}N^+$				
$C_{12}H_{11}N^+$ (Diphenylamine)	$(C_6H_5)_2NH$		7.25 ± 0.03	PI	223*	1140
		$C_{12}H_{19}N^+$				
$C_{12}H_{19}N^+$ (*N*,*N*-Di-*n*-propylaniline)	$C_6H_5N(C_3H_7)_2$		6.96	CTS	163*	1281
$C_{12}H_{19}N^+$ (*N*,*N*-Dimethyl-*p*-*tert*-butylaniline)	$C_6H_4N(CH_3)_2C_4H_9$		7.43	CTS	166*	1281
		$C_{14}H_{23}N^+$				
$C_{14}H_{23}N^+$ (*N*,*N*-Di-*n*-butylaniline)	$C_6H_5N(C_4H_9)_2$		6.95	CTS	153*	1281
		$C_{18}H_{15}N^+$				
$C_{18}H_{15}N^+$ (Triphenylamine)	$(C_6H_5)_3N$		6.86 ± 0.03	PI	243*	1140

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CHN_2^+				
CHN_2^+ (Diazomethane)	CH_2N_2	H	14.8 ± 0.1	VC	338	314
CHN_2^+ (Diazirine)	CH_2N_2	H	14.2 ± 0.1	VC	355	314
		$CH_2N_2^+$ (Diazomethane) Heat of formation 257 kcal mol^{-1}				
		$CH_2N_2^+$ (Diazirine) 314 kcal mol^{-1}				
$CH_2N_2^+$ (Diazomethane)	CH_2N_2		8.999 ± 0.001	S	257*	1169
$CH_2N_2^+$ (Diazomethane)	CH_2N_2		9.03 ± 0.05	VC	257	314
$CH_2N_2^+$ (Diazomethane)	CH_2N_2		9.2 ± 0.3	NS	261	464
$CH_2N_2^+$ (Diazirine)	CH_2N_2		10.18 ± 0.05	VC	314*	314
$CH_2N_2^+$	$CH_3N_2H_3$	$H_2 + 2H$	15.2 ± 0.2	SL	269	424
		$CH_3N_2^+$				
$CH_3N_2^+$	$CH_3N_2H_3$	$H_2 + H$	9.2 ± 0.2	PI	183	1141
$CH_3N_2^+$	$CH_3N_2H_3$	$H_2 + H$	11.9 ± 0.3	SL	245	424
$CH_3N_2^+$	$CH_3N_2H_3$	3H?	14.8 ± 0.3	SL	208	424
$CH_3N_2^+$	$CH_3N{=}NCH_3$	CH_3	9.0 ± 0.1	SL	217	304
$CH_3N_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	$CH_3 + H_2$	9.7 ± 0.5	SL	212	424
		$CH_4N_2^+$				
$CH_4N_2^+$	$CH_3N_2H_3$	H_2	9.4 ± 0.1	PI	239	1141
$CH_4N_2^+$	$CH_3N_2H_3$	H_2	11.2 ± 0.1	PI		1141
$CH_4N_2^+$	$CH_3N_2H_3$	H_2	10.4 ± 0.2	SL	262	424
$CH_4N_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_4	9.7 ± 0.3	SL	263	424
$CH_4N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		9.6 ± 0.1	PI		1141
$CH_4N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		11.0 ± 0.1	PI		1141
		$CH_5N_2^+$				
$CH_5N_2^+$	$CH_3N_2H_3$	H	9.2 ± 0.1	PI	183	1141
$CH_5N_2^+$	$CH_3N_2H_3$	H	10.9 ± 0.2	PI		1141
$CH_5N_2^+$	$CH_3N_2H_3$	H	10.2 ± 0.1	SL	206	424
$CH_5N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3	8.4 ± 0.1	PI	180	1141
$CH_5N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3	9.8 ± 0.1	PI		1141
$CH_5N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3	9.7 ± 0.2	SL	210	424
$CH_5N_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3	9.1 ± 0.2	SL	198	424
$CH_5N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		9.0 ± 0.1	PI		1141
$CH_5N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		10.6 ± 0.1	PI		1141

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CH_6N_2^+$				
$CH_6N_2^+$	$CH_3N_2H_3$		8.00 ± 0.06	PI	207	2173, 1141
$CH_6N_2^+$	$CH_3N_2H_3$		11.1 ± 0.1	PI		1141
$CH_6N_2^+$	$CH_3N_2H_3$		8.63 ± 0.1	SL	222	424
		$C_2H_5N_2^+$				
$C_2H_5N_2^+$	$(CH_3)_3N_2H$	$CH_3 + H_2$	11.1 ± 0.4	SL	242	424
$C_2H_5N_2^+$	$(CH_3)_4N_2$	$CH_3 + CH_4$?	12.4 ± 0.2	SL	287	424
		$CH_3N{=}NCH_3^+$ Heat of formation 243 kcal mol^{-1}				
$C_2H_6N_2^+$	$CH_3N{=}NCH_3$		8.65 ± 0.1	SL	243*	304
$C_2H_6N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H_2	9.5 ± 0.1	PI	239	1141
$C_2H_6N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H_2	11.4 ± 0.2	PI		1141
$C_2H_6N_2^+$	$(CH_3)_4N_2$	C_2H_6	10.5 ± 0.1	SL	279	424
$C_2H_6N_2^+$	$(CH_3)_4N_2$	$2CH_3$?	13.3 ± 0.5	SL	257	424
$C_2H_6N_2^+$ (1-Methyl-1-*n*-butylbydrazine)	$C_4H_9(CH_3)N_2H_2$	C_3H_8	9.5 ± 0.2	PI	248	1141
$C_2H_6N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$	C_3H_8	10.6 ± 0.1	PI		1141
		$C_2H_7N_2^+$				
$C_2H_7N_2^+$ (1,1-Dimethylhydrazyl radical)	$(CH_3)_2N_2H$		6.6 ± 0.3	SL	(a)	67
$C_2H_7N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H	8.7 ± 0.2	PI	168	1141
$C_2H_7N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H	11.0 ± 0.2	PI		1141
$C_2H_7N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H	10.2 ± 0.2	SL	203	424
$C_2H_7N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H	10.0 ± 0.3	SL	198	67
$C_2H_7N_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	H	9.3 ± 0.2	SL	183	424
$C_2H_7N_2^+$	$(CH_3)_3N_2H$	CH_3	9.4 ± 0.1	SL	203	424
$C_2H_7N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		9.1 ± 0.1	PI		1141
$C_2H_7N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	$C_4H_9(CH_3)N_2H_2$		10.7 ± 0.1	PI		1141
		$C_2H_8N_2^+$				
$C_2H_8N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		7.67 ± 0.05	PI	197	1141, 2173
$C_2H_8N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		10.6 ± 0.1	PI		1141
$C_2H_8N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		11.2 ± 0.1	PI		1141
$C_2H_8N_2^+$ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		8.12 ± 0.1	SL	207	424
$C_2H_8N_2^+$ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$		7.75 ± 0.1	SL	200	424

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_7N_2^+$				
$C_3H_7N_2^+$	$(CH_3)_3N_2H$	$H_2 + H$	10.7 ± 0.1	SL	214	424
$C_3H_7N_2^+$	$(CH_3)_4N_2$	$CH_3 + H_2$	10.7 ± 0.1	SL	230	424
		$C_3H_8N_2^+$				
$C_3H_8N_2^+$	$(CH_3)_3N_2H$	H_2	8.2 ± 0.1	SL	208	424
$C_3H_8N_2^+$	$(CH_3)_4N_2$	CH_4	8.9 ± 0.1	SL	240	424
		$C_3H_9N_2^+$				
$C_3H_9N_2^+$	$(CH_3)_3N_2H$	H	8.9 ± 0.1	SL	172	424
$C_3H_9N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$	CH_3	8.0 ± 0.1	PI	160	1141
$C_3H_9N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$	CH_3	8.5 ± 0.2	PI	172	1141
$C_3H_9N_2^+$	$(CH_3)_4N_2$	CH_3	9.1 ± 0.1	SL	193	424
		$C_3H_{10}N_2^+$				
$C_3H_{10}N_2^+$	$(CH_3)_3N_2H$		7.93 ± 0.1	SL	202*	424
		$C_4H_3N_2^+$				
$C_4H_3N_2^+$ (Metadiazine)	$C_4H_4N_2$	H	13.01 ± 0.10	EVD	295	1406
$C_4H_3N_2^+$ (Paradiazine)	$C_4H_4N_2$	H	13.68 ± 0.10	EVD	310	1406
		$C_4H_4N_2^+$				
$C_4H_4N_2^+$ (Orthodiazine)	$C_4H_4N_2$		9.77 ± 0.05	EVD	292*	1406
$C_4H_4N_2^+$ (Orthodiazine)	$C_4H_4N_2$		10.04 ± 0.05	EVD	298*	1406
$C_4H_4N_2^+$ (Metadiazine)	$C_4H_4N_2$		9.83 ± 0.05	EVD	274*	1406
$C_4H_4N_2^+$ (Metadiazine)	$C_4H_4N_2$		10.12 ± 0.05	EVD	280*	1406
$C_4H_4N_2^+$ (Paradiazine)	$C_4H_4N_2$		9.59 ± 0.05	EVD	268*	1406
$C_4H_4N_2^+$ (Paradiazine)	$C_4H_4N_2$		10.09 ± 0.05	EVD	280*	1406
		$C_4H_{10}N_2^+$				
$C_4H_{10}N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$	H_2	8.3 ± 0.2	PI	200	1141
		$C_4H_{11}N_2^+$				
$C_4H_{11}N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$	H	8.9 ± 0.1	PI	162	1141
$C_4H_{11}N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$	H	11.1 ± 0.1	PI		1141
$C_4H_{11}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	CH_3	8.0 ± 0.1	PI	155	1141
$C_4H_{11}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	CH_3	9.6 ± 0.2	PI		1141

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_{12}N_2^+$				
$C_4H_{12}N_2^+$ (1,1-Diethylhydrazine)	$(C_2H_5)_2N_2H_2$		7.59 ± 0.05	PI	184	1141
$C_4H_{12}N_2^+$	$(CH_3)_4N_2$		7.76 ± 0.05	SL	196*	424
		$C_5H_6N_2^+$				
$C_5H_6N_2^+$ (4-Aminopyridine)	$C_5H_4NNH_2$		8.97 ± 0.05	SL	244*	217
		$C_5H_{12}N_2^+$				
$C_5H_{12}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	H_2	8.0 ± 0.2	PI	188	1141
$C_5H_{12}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	H_2	10.6 ± 0.1	PI		1141
		$C_5H_{13}N_2^+$				
$C_5H_{13}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	H	8.0 ± 0.3	PI	136	1141
$C_5H_{13}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	H	10.4 ± 0.1	PI		1141
$C_5H_{13}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$	H	11.3 ± 0.1	PI		1141
		$C_5H_{14}N_2^+$				
$C_5H_{14}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$		7.62 ± 0.05	PI	180	1141, 2173
$C_5H_{14}N_2^+$ (1-Methyl-1-*n*-butylhydrazine)	*n*-$C_4H_9(CH_3)N_2H_2$		10.6 ± 0.1	PI		1141
		$C_6H_8N_2^+$				
$C_6H_8N_2^+$ (*o*-Benzenediamine)	$C_6H_4(NH_2)_2$		8.00	SL	214	1066
$C_6H_8N_2^+$ (*m*-Benzenediamine)	$C_6H_4(NH_2)_2$		7.96	SL	214	1066
$C_6H_8N_2^+$ (*p*-Benzenediamine)	$C_6H_4(NH_2)_2$		7.58	SL	205	1066
$C_6H_8N_2^+$ (Phenylhydrazine)	$C_6H_5N_2H_3$		7.64 ± 0.02	PI	233	1166
		$C_{10}H_{16}N_2^+$				
$C_{10}H_{16}N_2^+$ (*p-bis*(Dimethylamino)benzene)	$(CH_3)_2NC_6H_4N(CH_3)_2$		6.9	CTS	180*	2037
		CHN_3^{+2}				
CHN_3^{+2}	CH_3N_3	2H?	34	SL	737	340
		$CH_3N_3^+$				
$CH_3N_3^+$	CH_3N_3		9.5 ± 0.1	SL	276*	340

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{10}H_{15}BH_2^{+2}$				
$C_{10}H_{15}BN_2^{+2}$	$C_{10}H_{15}BN_2$ (1,3-Dimethyl-2-phenyl-1,3,2-diazaborolidine)		23.5 ± 1	NS		1418
		$C_6H_{18}BN_3^{+2}$				
$C_6H_{18}BN_3^{+2}$	$C_6H_{18}BN_3$ (*tris*(Dimethylamino)borane)		21 ± 1	NS		1418
		$O^+(^4S_{3/2})$ Heat of formation 374 kcal mol^{-1}				
		$O^+(^2D)$ 450 kcal mol^{-1}				
		$O^+(^2P)$ 489 kcal mol^{-1}				
$O^+(^4S_{3/2})$	O		13.618	S	374*	2113
O^+	O		13.90 ± 0.2	LE	380	79
O^+	O		13.9 ± 0.2	LE	380	2021
O^+	O		13.6 ± 0.5	LE	373	2128
O^+	O		13.7 ± 0.5	LE	375	2130
$O^+(^2D)$	O		16.94	S	450*	2113
$O^+(^2P)$	O		18.64	S	489*	2113
O^+	O_2	O^-	17.3 ± 0.10	RPD	375	288
O^+	O_2	O^-	17.2	RPD	372	200
O^+	O_2	O^-	17.25 ± 0.1	FPD	374	2014
O^+	O_2	O^-	17.1 ± 0.2	LE	370	79
O^+	O_2	O^-	17.264 ± 0.009	D	374	6
$O^+(^2D)$	O_2	O^-	20.7 ± 0.4	PI	453	163
$O^+(^2D)$	O_2	O^-	20.4 ± 0.1	FDP	446	2014
$O^+(^2D)$	O_2	O^-	20.3 ± 0.2	LE	444	79
O^+	O_2	O^-	21.30 ± 0.03	RPD		288
O^+	O_2		19.7 ± 0.1	FDP		2014
O^+	O_2	O	18.8 ± 0.4	PI	374	163
O^+	O_2	O	18.99 ± 0.05	RPD	378	288
O^+	O_2	O	18.8 ± 0.1	FDP	374	2014
O^+	O_2	O	18.9 ± 0.2	LE	376	79
O^+	O_2	O	20.42 ± 0.04	RPD		288
O^+	O_2	$O(^1D)$	20.55 ± 0.1	FDP	369	2014
O^+	O_2	O	22.03 ± 0.03	RPD		288
$O^+(^2D)$	O_2	O	22.0 ± 0.1	FDP	448	2014
O^+	O_2	$O(^1S)$	23.4 ± 0.5	PI	383	163
O^+	H_2O_2		17.0 ± 1.0	LE		37
O^+	H_2O_2		28.3 ± 1.0	LE		37
O^+	CO	C^-	23.41 ± 0.17	RPD		2180, 2191
O^+	CO	C^-	23.7	RPD		200
O^+	CO	C^-	23.6 ± 0.2	FDP		1378
O^+	CO	C^-	24.78 ± 0.23	RPD	374	2180, 2191

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
O^+	CO_2	CO	19.2 ± 0.3	PI	375	163
O^+	CO_2	CO	19.0 ± 0.3	LE	371	2021
O^+	CO_2	CO?	20.3 ± 0.2	PI		163
O^+	CO_2	CO?	20.3 ± 0.4	LE		2021
$O^+(^2D)$	CO_2	CO	22.3 ± 0.4	PI	447	163
$O^+(^2D)$	CO_2	CO	22.4 ± 0.6	LE	449	2021
$O^+(^2P)$	CO_2	CO	24.6 ± 0.3	LE	500	2021
O^+	NO	N	19.5 ± 0.2	PI	358	163
O^+	NO	N	20.11 ± 0.03	RPD	372	328
O^+	NO	N	20.3 ± 0.5	LE	377	2021
O^+	NO	$N(^2D)$	20.7 ± 0.5	PI	331	163
O^+	N_2O	N_2	15.3 ± 0.4	PI	372	163
O^+	N_2O	N_2	15.33 ± 0.02	SL	373	58
O^+	N_2O	N_2	15.4 ± 0.1	MSD	375	1451
O^+	NO_2	NO	17.6 ± 0.2	PI	392	163
O^+	NO_2	NO	17.0	RPD	378	2018
O^+	NO_2	NO	17.7	RPD		2018
O^+	NO_2	NO	18.9	RPD		2018
O^+	NO_2	NO	18.4 ± 0.5	LE	411	2021
$O^+(^2D)$	NO_2	NO	20.5 ± 0.2	PI	459	163
$O^+(^2D)$	NO_2	NO	20.3	RPD	454	2018
O^+	NO_2	N + O	24.2 ± 1	LE	393	2021
O^+	CH_2NO_2		14.50 ± 0.16	VC		90
O^+	SO_2	SO	20.6	SL		418
O^+	ClO_3F		22 ± 1	SL		53
O^+	$POCl_3$		13 ± 2	NS		1101
	O_2^+ ($X\ ^2\Pi_g$) Heat of formation 278 kcal mol^{-1}					
	O_2^+ ($a\ ^4\Pi_u$) 371 kcal mol^{-1}					
	O_2^+ ($A\ ^2\Pi_u$) 388 kcal mol^{-1}					
	O_2^+ ($b\ ^4\Sigma_g^-$) 419 kcal mol^{-1}					
$O_2^+(X\ ^2\Pi_g)$	O_2		12.063 ± 0.001	PI	278*	2048
$O_2^+(X\ ^2\Pi_g)$	O_2		12.065 ± 0.003	PI	278*	1032
$O_2^+(X\ ^2\Pi_g)$	O_2		12.078 ± 0.005	PI	279*	2013
$O_2^+(X\ ^2\Pi_g)$	O_2		12.075 ± 0.01	PI	278*	182, 416
$O_2^+(X\ ^2\Pi_g)$	O_2		12.1 ± 0.1	PI	279	230
$O_2^+(X\ ^2\Pi_g)$	O_2		12.2 ± 0.3	PI	281	163
$O_2^+(X\ ^2\Pi_g)$	O_2		12.10	PE	279	1108
$O_2^+(X\ ^2\Pi_g)$	O_2		12.04 ± 0.02	EM	278	1094
$O_2^+(X\ ^2\Pi_g)$	O_2		12.20 ± 0.05	EM	281	116
$O_2^+(X\ ^2\Pi_g)$	O_2		12.21 ± 0.04	RPD	282	287, 288
$O_2^+(X\ ^2\Pi_g)$	O_2		12.20	RPD	281	119
$O_2^+(X\ ^2\Pi_g)$	O_2		12.15 ± 0.1	SL	280	31
$O_2^+(X\ ^2\Pi_g)$	O_2		12.31 ± 0.1	SL	284	364
$O_2^+(X\ ^2\Pi_g)$	O_2		12.2	VC	281	2136
$O_2^+(X\ ^2\Pi_g)$	O_2		12.45 ± 0.10	CS	287	383
$O_2^+(X\ ^2\Pi_g)$	O_2		12.23 ± 0.07	LE	282	79
$O_2^+(X\ ^2\Pi_g)$	O_2		12.16 ± 0.08	LE	280	1029
$O_2^+(X\ ^2\Pi_g)$	O_2		12.23 ± 0.08	LE	282	3
$O_2^+(X\ ^2\Pi_g)$	O_2		12.5 ± 0.3	NS	288	2188
$O_2^+(X\ ^2\Pi_g)$	O_2		12.5	EC	288	218

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
O_2^+ (Autoionization)	O_2		13.1	RPD		119
O_2^+ (Autoionization)	O_2		13.6	RPD		119
O_2^+ (Autoionization)	O_2		14.3 ± 0.5	PI		163
$O_2^+(a\ ^4\Pi_u)$	O_2		16.1060	S	371*	2099
$O_2^+(a\ ^4\Pi_u)$	O_2		15.9 ± 0.2	PI	367	163
$O_2^+(a\ ^4\Pi_u)$	O_2		16.26	PE	375	1108
$O_2^+(a\ ^4\Pi_u)$	O_2		16.42	PE	379	1130
$O_2^+(a\ ^4\Pi_u)$	O_2		16.24 ± 0.03	EM	375	116
$O_2^+(a\ ^4\Pi_u)$	O_2		16.30 ± 0.03	RPD	376	287, 288
$O_2^+(a\ ^4\Pi_u)$	O_2		16.2	RPD	374	119
$O_2^+(a\ ^4\Pi_u)$	O_2		15.7 ± 0.5	LE	362	79
$O_2^+(A\ ^2\Pi_u)$	O_2		16.8261	S	388*	2099
$O_2^+(A\ ^2\Pi_u)$	O_2		16.9 ± 0.3	PI	390	163
$O_2^+(A\ ^2\Pi_u)$	O_2		17.12 ± 0.04	EM	395	116
$O_2^+(A\ ^2\Pi_u)$	O_2		17.18 ± 0.02	RPD	396	287, 288
$O_2^+(A\ ^2\Pi_u)$	O_2		17.1	RPD	394	119
$O_2^+(A\ ^2\Pi_u)$	O_2		17.0	VC	392	2136
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.1724 ± 0.0006	S	419*	2099
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.8 ± 0.4	PI	434	163
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		17.99	PE	415	1130
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.18	PE	419	1108
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.40 ± 0.03	EM	424	116
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.42 ± 0.02	RPD	425	287, 288
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.1	RPD	417	119
$O_2^+(b\ ^4\Sigma_g^-)$	O_2		18.0 ± 0.5	LE	415	79
O_2^+	O_2		20.12	PE	464	1130
O_2^+	O_2		20.31	PE	468	1108
O_2^+	O_2		21.2 ± 0.4	PI	489	163
O_2^+	O_2		21.29 ± 0.04	EM	491	116
O_2^+	O_2		21.34 ± 0.02	RPD	492	287, 288
O_2^+	H_2O_2	H_2	15.8 ± 0.5	LE	332	37
O_2^+	H_2O_2	2H	20.5 ± 0.5	LE	336	37
O_2^+	SO_2	S	17.5 ± 0.3	SL	266	418
O_2^+	ClO_3F		15 ± 1	SL		54
O_3^+ Heat of formation 318 kcal mol^{-1}						
O_3^+	O_3		11.7?	PI	304	416
O_3^+	O_3		12.3 ± 0.1	PE	318*	1441
O_3^+	O_3		12.52 ± 0.05	PE		1441
O_3^+	O_3		13.52 ± 0.05	PE		1441
O_3^+	O_3		16.9 ± 0.5	PE		1441
O_3^+	O_3		19.24 ± 0.1	PE		1441
O_3^+	O_3		12.89 ± 0.10	RPD	331	20
O_3^+	O_3		12.80 ± 0.05	EVD	329	77

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		OH^+ Heat of formation 312 kcal mol^{-1}				
HO^+	OH		13.17 ± 0.1	SL	313*	67
HO^+	H_2O	H	18.3 ± 0.2	PI	312*	427
HO^+	H_2O	H	18.59 ± 0.08	SL	319	2066
HO^+	H_2O	H	18.19	SL	310	67
HO^+	H_2O_2	OH	15.60 ± 0.08	SL	318	2066
HO^+	H_2O_2	OH	15.35 ± 0.10	SL	312	37
HO^+	CH_3COOH		15.1	SL		298
		H_2O^+ Heat of formation 233 kcal mol^{-1}				
H_2O^+	H_2O		12.614 ± 0.005	PI	233*	2013
H_2O^+	H_2O		12.597 ± 0.010	PI	233*	1253
H_2O^+	H_2O		12.59 ± 0.01	PI	233*	182, 416
H_2O^+	H_2O		12.62 ± 0.02	PI	233*	1103
H_2O^+	H_2O		12.5 ± 0.1	PI	230	230
H_2O^+	H_2O		12.6 ± 0.1	PI	233	427
H_2O^+	H_2O		12.61	PE	233	1130
H_2O^+	H_2O		12.60 ± 0.01	RPD	233	463
H_2O^+	H_2O		12.59 ± 0.05	RPD	233	1372
H_2O^+	H_2O		12.63	RPD	233	97
H_2O^+	H_2O		12.6	RPD	233	2060
H_2O^+	H_2O		12.69 ± 0.08	SL	235	2066
H_2O^+	H_2O		12.67	VC	234	2136
H_2O^+	H_2O		14.23	PE		1130
$H_2O^+(^2A_1)$	H_2O		14.35 ± 0.03	RPD	273	463
H_2O^+	H_2O		14.2	RPD		2060
$H_2O^+(^2B_2)$	H_2O		16.34 ± 0.06	RPD	319	463
H_2O^+	H_2O		16.2	RPD		2060
H_2O^+	H_2O		18.02	PE		1130
H_2O^+	H_2O		20.3 ± 0.4	PI		427
H_2O^+	H_2O_2	O	14.09 ± 0.10	SL	233	37
		D_2O^+ Heat of formation 232 kcal mol^{-1}				
D_2O^+	D_2O		12.637 ± 0.005	PI	232*	2013
D_2O^+	D_2O		12.69	PE	233	1130
D_2O^+	D_2O		14.28	PE		1130
D_2O^+	D_2O		18.07	PE		1130
		H_3O^+				
H_3O^+	C_2H_5OH	C_2H_3	12.01 ± 0.1	NS	156	339
H_3O^+	*n*-C_3H_7OH	$C_3H_3 + H_2$	12.66 ± 0.1	NS	155	339
H_3O^+	*iso*-C_3H_7OH	$C_2H_2 + CH_3$	13.44 ± 0.1	NS	157	339
H_3O^+	*sec*-C_4H_9OH	$C_2H_2 + C_2H_5$	13.36 ± 0.1	NS	158	339
H_3O^+	$(C_2H_5)_2O$	$C_2H_2 + C_2H_5$	13.18 ± 0.1	NS	164	339
H_3O^+	*n*-$C_3H_7CH(OH)CH_3$	*n*-$C_3H_7 + C_2H_2$	13.36 ± 0.1	NS	156	339
H_3O^+	*iso*-$C_3H_7CH(OH)CH_3$	*iso*-$C_3H_7 + C_2H_2$	13.18 ± 0.1	NS	156	339
H_3O^+	$HCOOC_2H_5$	$C_2H_2 + HCO$	13.10 ± 0.1	NS	163	339
H_3O^+	$HCOOCH(CH_3)_2$	$C_2H_2 + CO + CH_3$	13.75 ± 0.1	NS	159	339
		HO_2^+ Heat of formation 271 kcal mol^{-1}				
HO_2^+	HO_2		11.53 ± 0.02	SL	271*	36, 31
HO_2^+	H_2O_2	H	15.36 ± 0.05	SL	270*	36, 37
HO_2^+	H_2O_2	H	15.41 ± 0.1	SL	271*	31

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$H_2O_2^+$ Heat of formation 223 kcal mol^{-1}				
$H_2O_2^+$	H_2O_2		11.26 ± 0.05	SL	227*	2066
$H_2O_2^+$	H_2O_2		10.92 ± 0.05	VC	219*	37
		Li_2O^+ Heat of formation 118 kcal mol^{-1}				
Li_2O^+	Li_2O		6.8 ± 0.2	VC	117*	318
Li_2O^+	Li_2O		6.9 ± 0.3	LE	119*	1112
		BeO^+				
BeO^+	BeO		10.1 ± 0.4	VC	264	1106
		Be_2O^+				
Be_2O^+	Be_2O		10.5 ± 0.5	VC	224	1106
		$Be_2O_2^+$				
$Be_2O_2^+$	Be_2O_2		11.1 ± 0.4	VC	154	1106
		$Be_3O_2^+$				
$Be_3O_2^+$	Be_3O_2		12.5 ± 1.0	VC		1106
		$Be_3O_3^+$				
$Be_3O_3^+$	Be_3O_3		10.7 ± 0.4	VC	−13	1106
		BO_2^+				
BO_2^+	$(CH_3O)_3B$	$CH_3O + 2CH_3$	17.5 ± 0.3	EVD	123	115
		BO_3^+				
BO_3^+	$(CH_3O)_3B$	$3CH_3$	13.2 ± 0.3	EVD	−10	115
BO_3^+	$(CH_3O)_3B$	$3CH_3$	12.7 ± 1.0	SL	−22	364
		$CO^+(X\ ^2\Sigma^+)$ Heat of formation 297 kcal mol^{-1} **$CO^+(A\ ^2\Pi_i)$ 355 kcal mol^{-1}** **$CO^+(B\ ^2\Sigma^+)$ 427 kcal mol^{-1}**				
$CO^+(X\ ^2\Sigma^+)$	CO		14.013 ± 0.004	S	297*	2098
$CO^+(X\ ^2\Sigma^+)$	CO		13.985	PI	296	1382
$CO^+(X\ ^2\Sigma^+)$	CO		14.01 ± 0.01	PI	297	416
$CO^+(X\ ^2\Sigma^+)$	CO		13.9 ± 0.2	PI	294	163
$CO^+(X\ ^2\Sigma^+)$	CO		13.98	PE	296	1108
$CO^+(X\ ^2\Sigma^+)$	CO		14.01	PE	297	1130
$CO^+(X\ ^2\Sigma^+)$	CO		14.11 ± 0.03	RPD	299	1012
$CO^+(X\ ^2\Sigma^+)$	CO		14.15 ± 0.02	CS	300	2023
$CO^+(X\ ^2\Sigma^+)$	CO		14.2 ± 0.1	FDP	301	1051, 1172
$CO^+(X\ ^2\Sigma^+)$	CO		14.01 ± 0.08	LE	297	3
$CO^+(X\ ^2\Sigma^+)$	CO		14.06 ± 0.08	LE	298	1029
CO^+ (Autoionization)	CO		15.5 ± 0.2	PI		163
CO^+ (Autoionization)	CO		15.6 ± 0.1	RPD		1012

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$CO^+(A\,^2\Pi_i)$	CO		16.537 ± 0.004	S	355*	2098
$CO^+(A\,^2\Pi_i)$	CO		16.6 ± 0.3	PI	356	163
$CO^+(A\,^2\Pi_i)$	CO		16.51	PE	354	1130
$CO^+(A\,^2\Pi_i)$	CO		16.58	PE	356	1108
$CO^+(A\,^2\Pi_i)$	CO		16.5 ± 0.1	RPD	354	1012
CO^+ (Autoionization)	CO		18.4 ± 0.3	PI		163
CO^+ (Autoionization)	CO		18.4 ± 0.1	RPD		1012
$CO^+(B\,^2\Sigma^+)$	CO		19.671 ± 0.004	S	427*	2098
$CO^+(B\,^2\Sigma^+)$	CO		20.1 ± 0.2	PI	437	163
$CO^+(B\,^2\Sigma^+)$	CO		19.67	PE	427	1108
$CO^+(B\,^2\Sigma^+)$	CO		19.72	PE	428	1130
$CO^+(B\,^2\Sigma^+)$	CO		19.6 ± 0.1	RPD	426	1012
CO^+	CO		25.7 ± 0.5	PI		163
CO^+	CO_2	O^-	19.5 ± 0.2	PI	331	163
CO^+	CO_2	O	20.5 ± 0.2	PI	319	163
CO^+	CO_2	$O(^1D)$	23.3 ± 1.0	PI	338	163
CO^+	CH_2O	2H?	18.7 ± 0.2	EVD	299	204
CO^+	CD_2O	2D?	18.8 ± 0.3	EVD		204
CO^+	CH_3OH		13.7	LE		46
CO^+	CH_3CHO	CH_4	13.9 ± 0.1	MSD	299	1404
CO^+ (Ethylene oxide)	C_2H_4O	CH_4	12.6 ± 0.4	EVD	296	50
		CO^{+2}				
CO^{+2}	CO^+ $(C\,^2\Sigma^+)$		15.9 ± 0.7	NS		2016
CO^{+2}	CO^+ $(A\,^2\Pi_i)$		25.0 ± 0.4	NS	932	2016
CO^{+2}	CO		41.8 ± 0.3	FDP	938	212
CO^{+2}	CO		45.9	FDP		212
		$CO_2^+(X\,^2\Pi_{3/2g})$ Heat of formation 223 kcal mol^{-1}				
		$CO_2^+(X\,^2\Pi_{1/2g})$ 224 kcal mol^{-1}				
		$CO_2^+(A\,^2\Pi_{3/2u})$ 305 kcal mol^{-1}				
		$CO_2^+(B\,^2\Sigma_u^+)$ 323 kcal mol^{-1}				
		$CO_2^+(C\,^2\Sigma_g^+)$ 353 kcal mol^{-1}				
$CO_2^+(X\,^2\Pi_{3/2g})$	CO_2		13.769 ± 0.03	S	223*	148
$CO_2^+(X\,^2\Pi_{1/2g})$	CO_2		13.792 ± 0.03	S	224*	148
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.788	S	224	149
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.793	S	224	148
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.78 ± 0.01	S	224	410
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.79 ± 0.01	PI	224	182, 416
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.6 ± 0.2	PI	220	163
$CO_2^+(X\,^2\Pi_g)$	CO_2		14.0 ± 0.3	PI	229	230
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.68	PE	221	92, 1130
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.85 ± 0.10	RPD	225	164, 169
$CO_2^+(X\,^2\Pi_g)$	CO_2		13.78 ± 0.08	LE	224	3, 1029
CO_2^+ (Autoionization)	CO_2		14.9 ± 0.2	PI		163

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$CO_2^+(A\ ^2\Pi_{3/2u})$	CO_2		17.312	S	305*	1179
$CO_2^+(A\ ^2\Pi_{1/2u})$	CO_2		17.323	S	305*	1179
$CO_2^+(A\ ^2\Pi_u)$	CO_2		17.0 ± 0.2	PI	298	163
$CO_2^+(A\ ^2\Pi_u)$	CO_2		17.23	PE	303	1130
$CO_2^+(A\ ^2\Pi_u)$	CO_2		17.27	PE	304	92
$CO_2^+(A\ ^2\Pi_u)$	CO_2		17.23 ± 0.28	RPD	303	164, 169
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.068	S	323*	149
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.074	S	323*	148
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.076	S	323*	1179
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.084	S	323*	148
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.01 ± 0.01	S	321	409
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.08 ± 0.01	S	323*	409, 410
$CO_2^+(B\ ^2\Sigma_u^+)$	CO_2		18.08	PE	323	92, 1130
CO_2^+	CO_2		18.8 ± 0.3	PI		163
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.384	S	353*	148
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.391	S	353*	148
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.392	S	353*	148
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.38 ± 0.01	S	353*	409
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.39 ± 0.01	S	353*	409, 410
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.38	S	353*	149
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.29	PE	351	92, 1130
$CO_2^+(C\ ^2\Sigma_g^+)$	CO_2		19.25 ± 0.40	RPD	350	164, 169
CO_2^+	CO_2		20.5 ± 0.2	PI	379	163
CO_2^+	CO_2		21.00 ± 0.39	RPD	390	164, 169
		CO_2^{+2}				
CO_2^{+2}	CO_2		36.4 ± 0.3	FDP	745	212
CO_2^{+2}	CO_2		41.9	FDP		212
		$NO^+(X\ ^1\Sigma^+)$Heat of formation	**235 kcal mol^{-1}**			
		$NO^+(a\ ^3\Sigma^+)$	**349 kcal mol^{-1}**			
		$NO^+(\beta$ series limit)	**403 kcal mol^{-1}**			
		$NO^+(A\ ^1\Pi)$	**444 kcal mol^{-1}**			
$NO^+(X\ ^1\Sigma_{3/2}^+)$	NO		9.250 ± 0.005	PI	235*	1032, 1253
$NO^+(X\ ^1\Sigma_{3/2}^+)$	NO		9.248 ± 0.008	D	235*	1148
$NO^+(X\ ^1\Sigma_{1/2}^+)$	NO		9.267 ± 0.005	S	235*	1217
$NO^+(X\ ^1\Sigma_{1/2}^+)$	NO		9.266 ± 0.008	S	235*	1148
$NO^+(X\ ^1\Sigma^+)$	NO		9.25 ± 0.02	PI	235	416
$NO^+(X\ ^1\Sigma^+)$	NO		9.20 ± 0.03	PI	234	157
$NO^+(X\ ^1\Sigma^+)$	NO		9.25 ± 0.03	PI	235	86
$NO^+(X\ ^1\Sigma^+)$	NO		9.2 ± 0.1	PI	234	163
$NO^+(X\ ^1\Sigma^+)$	NO		9.23	PE	234	1108
$NO^+(X\ ^1\Sigma^+)$	NO		9.34	PE	237	1130
$NO^+(X\ ^1\Sigma^+)$	NO		9.25	PE	235	1415
$NO^+(X\ ^1\Sigma^+)$	NO		9.25 ± 0.02	RPD	235	328
NO^+ (Autoionization)	NO		11.4 ± 0.1	PI		163
NO^+ (Autoionization)	NO		12.8 ± 0.2	PI		163
$NO^+(a\ ^3\Sigma^+)$	NO		14.218 ± 0.006	S	349*	1217
$NO^+(a\ ^3\Sigma^+)$	NO		14.2 ± 0.2	PI	349	163

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
NO^+	NO		15.23	PE	373	1130
NO^+	NO		15.4	PE	377	1108
NO^+	NO		15.5	PE	379	1415
NO^+	NO		16.558 ± 0.001	S	403*	1217
(β Rydberg series limit)						
NO^+	NO		16.9 ± 0.4	PI	411	163
(β Rydberg series limit)						
NO^+	NO		16.53	PE	403	1108
(β Rydberg series limit)						
NO^+	NO		16.5	PE	402	1130, 1415
(β Rydberg series limit)						
$NO^+(A\,^1\Pi)$	NO		18.328 ± 0.005	S	444*	1217
$NO^+(A\,^1\Pi)$	NO		18.8 ± 0.3	PI	455	163
$NO^+(A\,^1\Pi)$	NO		18.27	PE	443	1130
$NO^+(A\,^1\Pi)$	NO		18.34	PE	445	1108
NO^+	NO		20.7 ± 0.4	PI	499	163
NO^+	N_2O	N	15.3 ± 0.4	PI	259	163
NO^+	N_2O	$N(^2D)$	16.4 ± 0.2	PI	230	163
NO^+	NO_2	O^-	10.83 ± 0.02	PI	233	117
NO^+	NO_2	O^-	11.3 ± 0.4	PI	244	163
$NO^+(A\,^1\Pi)$	NO_2	O^-	20.3 ± 0.3	PI	452	163
NO^+	NO_2	O	12.5 ± 0.1	PI	237	163
NO^+	NO_2	O	12.48 ± 0.43	EVD	236	139
NO^+	NO_2	$O(^1D)$	15.3 ± 0.4	PI	256	163
NO^+	NO_2	$O(^1S)$	16.5 ± 0.2	PI	232	163
$NO^+(a\,^3\Sigma^+)$	NO_2	O	17.7 ± 0.3	PI	357	163
NO^+	CH_3ONO	CH_3O	11.07 ± 0.06	RPD	239	1139
		NO^{+2}				
NO^{+2}	NO		39.8 ± 0.3	FDP	939	212
		$N_2O^+(X\,^2\Pi_{3/2})$ Heat of formation 317 kcal mol^{-1}				
		$N_2O^+(X\,^2\Pi_{1/2})$ 318 kcal mol^{-1}				
		$N_2O^+(^2\Sigma^+)$ 398 kcal mol^{-1}				
		$N_2O^+(C)$ 483 kcal mol^{-1}				
$N_2O^+(X\,^2\Pi_{3/2})$	N_2O		12.894	S	317*	149
$N_2O^+(X\,^2\Pi_{1/2})$	N_2O		12.931	S	318*	149
$N_2O^+(X\,^2\Pi)$	N_2O		12.94 ± 0.01	S	318	410
N_2O^+	N_2O		12.82 + 0.008	PI	317	1253
N_2O^+	N_2O		12.90 ± 0.01	PI	317	416
N_2O^+	N_2O		12.83 ± 0.07	PI	315	157
N_2O^+	N_2O		12.8 ± 0.2	PI	315	163
N_2O^+	N_2O		12.82	PE	315	92, 1130
N_2O^+	N_2O		12.75	RPD	314	2018
N_2O^+	N_2O		13.09 ± 0.05	SL	321	58
N_2O^+	N_2O		12.9 ± 0.1	MSD	317	1451
N_2O^+	N_2O		13.15	RPD		2018
N_2O^+	N_2O		13.75	RPD		2018
N_2O^+	N_2O		15.37?	PE		1130
N_2O^+	N_2O		15.5	RPD		2018

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$N_2O^+(^2\Sigma^+)$	N_2O		16.392	S	398*	149
$N_2O^+(^2\Sigma^+)$	N_2O		16.397	S	398*	149
$N_2O^+(^2\Sigma^+)$	N_2O		16.39 ± 0.01	S	398*	409, 410
N_2O^+	N_2O		16.9 ± 0.3	PI	409	163
N_2O^+	N_2O		16.37	PE	397	92, 1130
N_2O^+	N_2O		17.67	PE		92, 1130
N_2O^+	N_2O		18.8 ± 0.4	PI		163
$N_2O^+(C)$	N_2O		20.101	S	483*	149
$N_2O^+(C)$	N_2O		20.110	S	483*	149
$N_2O^+(C)$	N_2O		20.10 ± 0.01	S	483*	409, 410
N_2O^+	N_2O		20.7 ± 0.3	PI	497	163
N_2O^+	N_2O		20.10	PE	483	92, 1130
NO_2^+ Heat of formation 233 kcal mol^{-1}						
NO_2^+	NO_2		9.78 ± 0.05	PI	233*	117
NO_2^+	NO_2		9.80 ± 0.05	PI	234*	61
NO_2^+	NO_2		10.2	RPD	243	2018
NO_2^+	NO_2		11.1	PI	264	61
NO_2^+	NO_2		10.97	PE	261	1130
NO_2^+	NO_2		11.0	RPD	262	2018
NO_2^+	NO_2		11.3 ± 0.4	PI	269	163
NO_2^+	NO_2		11.27 ± 0.19	NS	268	139
NO_2^+	NO_2		11.3	EC	269	218
NO_2^+	NO_2		11.62	S	276	117
NO_2^+	NO_2		11.7?	PI	278	416
NO_2^+	NO_2		11.7	RPD	278	2018
NO_2^+	NO_2		12.5 ± 0.1	PI	296	163
NO_2^+	NO_2		12.7	PI	301	61
NO_2^+	NO_2		12.82	PE	304	1130
NO_2^+	NO_2		12.5	RPD	296	2018
NO_2^+	NO_2		13.4 ± 0.1	PI	317	163
NO_2^+	NO_2		13.48	PE	319	1130
NO_2^+	NO_2		14.01?	PE	331	1130
NO_2^+	NO_2		13.98 ± 0.12	SL	330	58
NO_2^+	NO_2		14.37?	PE	339	1130
NO_2^+	NO_2		15.3 ± 0.4	PI	361	163
NO_2^+	NO_2		16.2 ± 0.2	PI	382	163
NO_2^+	NO_2		16.79	PE	395	1130
NO_2^+	NO_2		17.8 ± 0.3	PI	418	163
NO_2^+	NO_2		18.87 ± 0.05	S	443	1097
NO_2^+	NO_2		18.86	PE	443	1130
NO_2^+	NO_2		20.0 ± 0.3	PI	469	163

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
NO_2^+	CH_3NO_2	CH_3	12.60 ± 0.10	RPD	240	1241
NO_2^+	CH_3NO_2	CH_3	16.90	RPD		1241
NO_2^+	$C_2H_5ONO_2$	C_2H_5O	11.40 ± 0.12	SL	235	1004, 1013
		$B_3H_2O_3^+$				
$B_3H_2O_3^+$	$B_3H_3O_3$	H	14.5 ± 0.5	NS	−7	2175
		$B_3H_3O_3^+$				
$B_3H_3O_3^+$	$B_3H_3O_3$		13.5 ± 0.5	NS	22	2175
		CHO^+ Heat of formation 221 kcal mol^{-1}				
CHO^+	CHO		10.03 ± 0.17	EVD	227	128
CHO^+	CHO		9.83 ± 0.18	EVD	223*	128
CHO^+	CHO		9.9 ± 0.3	EVD	224	127
CHO^+	CH_2O	H	13.10 ± 0.08	EVD	222*	127, 204
CHO^+	CH_2O	H	12.89 ± 0.10	EVD	217*	127
CHO^+	CH_2O	H	18.4 ± 0.3	LE		204
CHO^+	CH_3OH	$H_2 + H$	14.2	LE	227	46
CHO^+	CH_3CHO	CH_3	12.88 ± 0.10	EVD	224*	130
CHO^+	CH_3CHO	CH_3	12.70	SL	220*	298
CHO^+ (Ethylene oxide)	C_2H_4O	CH_3	12.2 ± 0.1	EVD	236	50
CHO^+	$CH_2{=}CHCHO$	C_2H_3	13.99 ± 0.10	EVD	235	130
CHO^+ (Propylene oxide)	C_3H_6O	C_2H_5	11.8 ± 0.2	EVD	225	50
CHO^+ (Trimethylene) oxide)	$(CH_2)_3O$	C_2H_5	12.6 ± 0.2	EVD	242	52
CHO^+ (3,4-Epoxy-1-butene)	C_4H_6O		12.9 ± 0.6	EVD		153
CHO^+ (Benzaldehyde)	C_6H_5CHO	C_6H_5	13.67 ± 0.13	EVD	233	130
CHO^+ (Benzaldehyde)	C_6H_5CHO	C_6H_5	13.71 ± 0.14	EVD	234	127
CHO^+	HCOOH	OH	13.75 ± 0.08	EVD	217*	127
CHO^+	CHOCHO	CHO	12.72 ± 0.12	EVD	223*	128
CHO^+	CHOCHO	CHO	13.75 ± 0.08	EVD		128
CHO^+	CH_3COCHO	CH_3CO	12.48 ± 0.05	EVD	226	128
CHO^+ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		14.4 ± 0.2	EVD		153
CHO^+	$(CH_3O)_3B$		19.1 ± 0.3	EVD		115
CHO^+ (Epichlorohydrin)	C_3H_5OCl	C_2H_4Cl	12.0 ± 0.5	EVD	231	153
CHO^+ (Epibromohydrin)	C_3H_5OBr	C_2H_4Br	11.8 ± 0.2	EVD	226	153
		CDO^+				
CDO^+	CD_2O	D	13.10 ± 0.12	EVD		127, 204
CDO^+	CD_2O	D	18.8 ± 0.3	LE		204
		CH_2O^+ Heat of formation 223 kcal mol^{-1}				
CH_2O^+	CH_2O		10.90 ± 0.03	PI	223*	1166
CH_2O^+	CH_2O		10.87 ± 0.1	PI	223*	182, 416
CH_2O^+	CH_2O		10.99 ± 0.03	RPD	225	286
CH_2O^+	CH_2O		11.81 ± 0.03	RPD		286
CH_2O^+	CH_2O		13.77 ± 0.04	RPD		286

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_2O^+	CH_2O		10.87 ± 0.07	EVD	223	127, 204
CH_2O^+	CH_2O		12.2 ± 0.2	LE		204
CH_2O^+	CH_2O		13.6 ± 0.2	LE		204
CH_2O^+	CH_3OH	H_2	12.7	LE	245	46
CH_2O^+	C_2H_5OH	CH_4	12.7	LE	255	46
CH_2O^+ (Propylene oxide)	C_3H_6O	C_2H_4	11.6 ± 0.3	EVD	233	50
CH_2O^+ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$	$C_2H_4 + CH_2O$	10.9 ± 0.2	EVD	224	153
CH_2O^+	$C_2H_5ONO_2$		11.76 ± 0.65	VC		1013
		CD_2O^+				
CD_2O^+	CD_2O		10.88 ± 0.08	EVD		127, 204
CD_2O^+	CD_2O		13.3 ± 0.2	LE		204
		CH_3O^+				
CH_3O^+	CH_3OH	H	12.32	RPD	184	97
CH_3O^+	CH_3OH	H	12.1 ± 0.1	VC	179	1100
CH_3O^+	CH_3OH	H	12.15	LE	180	46
CH_3O^+	C_2H_5OH	CH_3	12.34	RPD	195	97
CH_3O^+	C_2H_5OH	CH_3	11.3 ± 0.1	VC	171	1100
CH_3O^+	C_2H_5OH	CH_3	11.6	LE	178	46
CH_3O^+	CH_3OCH_3	CH_3^-?	10.0	RPD		2018
CH_3O^+	CH_3OCH_3	CH_3	11.0	RPD	176	2018
CH_3O^+	CH_3OCH_3	CH_3^-?	11.6	RPD		2018
CH_3O^+	CH_3OCH_3	CH_3?	12.3	RPD		2018
CH_3O^+	CH_3OCH_3	CH_3	12.7	RPD		2018
CH_3O^+	CH_3OCH_3	CH_3	12.1 ± 0.1	VC	202	1100
CH_3O^+ (Propylene oxide)	C_3H_6O	$C_2H_2 + H$	13.4 ± 0.2	EVD	181	50
CH_3O^+ (Trimethylene oxide)	$(CH_2)_3O$	$C_2H_2 + H$	13.3 ± 0.2	EVD	176	52
CH_3O^+	n-C_3H_7OH	C_2H_5	11.47	PI	178	11
CH_3O^+	n-C_3H_7OH	C_2H_5	12.13	RPD	193	97
CH_3O^+	n-C_3H_7OH	C_2H_5	11.1 ± 0.1	VC	169	1100
CH_3O^+	n-C_3H_7OH	C_2H_5	11.65	LE	182	46
CH_3O^+	*iso*-C_3H_7OH	C_2H_5	12.5	LE	201	46
CH_3O^+ (3.4-Epoxy-1-butene)	C_4H_6O		13.3 ± 0.5	EVD		153
CH_3O^+	n-C_4H_9OH	n-C_3H_7	11.46	RPD	176	97
CH_3O^+	n-C_4H_9OH	n-C_3H_7	11.4 ± 0.1	VC	174	1100
CH_3O^+	$C_2H_5OC_2H_5$	$C_2H_4 + CH_3$	12.35 ± 0.1	EVD	179	2196
CH_3O^+	$HCOOCH_3$	CHO	12.35 ± 0.1	SL	205	210
CH_3O^+	$HCOOCH_3$	CHO	12.1 ± 0.1	VC	199	1100
CH_3O^+	$HCOOC_2H_5$	CH_3CO	12.02 ± 0.1	SL	193	210
CH_3O^+	$HCOOC_2H_5$	CH_3CO	12.44 ± 0.1	VC	202	1059
CH_3O^+	CH_3COOCH_3	CH_3CO	12.7 ± 0.1	VC	198	1100
CH_3O^+	$HCOOCH(CH_3)_2$		13.45 ± 0.1	SL		210
CH_3O^+ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		13.9 ± 0.4	EVD		153
CH_3O^+	$(CH_3O)_3B$	$(CH_3O)_2B$	12.7 ± 0.2	EVD		115
CH_3O^+	CH_3ONO	NO	11.0 ± 0.1	VC	216	1100
CH_3O^+	CH_2OHCH_2Cl	CH_2Cl	11.51 ± 0.1	SL		72
CH_3O^+ (Epichlorohydrin)	C_3H_5OCl	$C_2H_2 + Cl$	13.4 ± 0.2	EVD	199	153
CH_3O^+ (Epibromohydrin)	C_3H_5OBr	$C_2H_2 + Br$	12.5 ± 0.2	EVD	192	153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CH_2DO^+				
CH_2DO^+	$DCOOCH(CH_3)_2$		13.53 ± 0.1	SL		210
		CH_3OH^+ Heat of formation 202 kcal mol^{-1}				
CH_4O^+	CH_3OH		10.85 ± 0.02	PI	202*	182, 416
CH_4O^+	CH_3OH		10.83	PE	202*	1130
CH_4O^+	CH_3OH		12.33	PE		1130
CH_4O^+	CH_3OH		14.64	PE		1130
CH_4O^+	CH_3OH		17.23	PE		1130
CH_4O^+	CH_3OH		10.95 ± 0.10	RPD	205	164, 1072
CH_4O^+	CH_3OH		12.82 ± 0.35	RPD		164, 1072
CH_4O^+	CH_3OH		14.50 ± 0.50	RPD		164, 1072
CH_4O^+	CH_3OH		16.06 ± 0.15	RPD		164, 1072
CH_4O^+	CH_3OH		18.85 ± 0.6	RPD		164, 1072
CH_4O^+	CH_3OH		11.15	RPD		2018
CH_4O^+	CH_3OH		12.1	RPD		2018
CH_4O^+	CH_3OH		13.2	RPD		2018
CH_4O^+	CH_3OH		13.7	RPD		2018
CH_4O^+	CH_3OH		10.8	RPD	201	28
CH_4O^+	CH_3OH		11.7	RPD		28
CH_4O^+	CH_3OH		12.6	RPD		28
CH_4O^+	CH_3OH		14.2	RPD		28
CH_4O^+	CH_3OH		10.8	RPD	201	2060
CH_4O^+	CH_3OH		11.8	RPD		2060
CH_4O^+	CH_3OH		12.5	RPD		2060
CH_4O^+	CH_3OH		14.5	RPD		2060
CH_4O^+	CH_3OH		10.97 ± 0.05	CS	205	383, 384
CH_4O^+	CH_3OH		10.9	LE	203	46
CH_4O^+	CH_3OH		10.79	TC	201	136
CH_4O^+	$HCOOCH_3$	CO	11.53 ± 0.1	SL	209	210
		C_2HO^+				
C_2HO^+ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		13.0 ± 0.3	EVD		153
		$C_2H_2O^+$				
$C_2H_2O^+$ (Ethylene oxide)	C_2H_4O	2H	14.0 ± 0.3	EVD	206	50
$C_2H_2O^+$	CH_3COCH_3	CH_4	10.37	PI	205	1099
$C_2H_2O^+$	CH_3COCH_3	CH_4	10.2	MSD	201	1404
$C_2H_2O^+$ (Propylene oxide)	C_3H_6O	$CH_3 + H$	12.7 ± 0.2	EVD	186	50
$C_2H_2O^+$ (3,4-Epoxy-1-butene)	C_4H_6O	C_2H_4	9.8 ± 0.4	EVD	224	153
$C_2H_2O^+$	n-C_4H_9OH		11.23	RPD		97
$C_2H_2O^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$	$CH_3 + CH_3O$	12.3 ± 0.3	EVD	208	153
$C_2H_2O^+$ (Epichlorohydrin)	C_3H_5OCl	$CH_2Cl + H$?	12.1 ± 0.1	EVD		153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_3CO^+ Heat of formation 152 kcal mol^{-1}						
$C_2H_3O^+$	CH_3CO		8.05 ± 0.17	EVD	181	128
$C_2H_3O^+$	CH_3CHO	H	11.67 ± 0.07	EVD	177	128, 130
$C_2H_3O^+$	CH_3CHO	H	11.45	SL	172	298
$C_2H_3O^+$	CH_3CHO	H	10.5 ± 0.2	MSD	150*	1404
$C_2H_3O^+$ (Ethylene oxide)	C_2H_4O	H	12.1 ± 0.2	EVD	214	50
$C_2H_3O^+$	C_2H_5OH	$H_2 + H$	14.5	LE	226	46
$C_2H_3O^+$	CH_3COCH_3	CH_3	10.33	PI	153*	95
$C_2H_3O^+$	CH_3COCH_3	CH_3	11.16 ± 0.09	EVD	172	128
$C_2H_3O^+$	CH_3COCH_3	CH_3	11.30	SL	176	298
$C_2H_3O^+$	CH_3COCH_3	CH_3	10.62 ± 0.04	VC	160	2174
$C_2H_3O^+$	CH_3COCH_3	CH_3	10.2 ± 0.1	MSD	150*	1404
$C_2H_3O^+$ (Propylene oxide)	C_3H_6O	CH_3	10.9 ± 0.2	EVD	196	50
$C_2H_3O^+$	$CH_3COC{\equiv}CH$	C_2H	11.85	SL	172	298
$C_2H_3O^+$	$CH_3COCH{=}CH_2$	C_2H_3	12.40	SL	194	298
$C_2H_3O^+$ (3,4-Epoxy-1-butene)	C_4H_6O	C_2H_3	10.5 ± 0.2	EVD	187	153
$C_2H_3O^+$	$CH_3COC_2H_5$	C_2H_5	10.3	PI	154*	95
$C_2H_3O^+$	$CH_3COC_2H_5$	C_2H_5	11.40	SL	180	298
$C_2H_3O^+$ (Tetrahydrofuran)	$(CH_2)_4O$	$C_2H_4 + H$	12.8 ± 0.2	EVD	188	52
$C_2H_3O^+$	$C_3H_7COCH_3$	*n*-C_3H_7?	11.55	SL	183	298
$C_2H_3O^+$	*iso*-$C_3H_7COCH_3$	*iso*-C_3H_7	10.4	PI	160	95
$C_2H_3O^+$	*n*-$C_4H_9COCH_3$	*n*-C_4H_9	10.8	PI	164	95
$C_2H_3O^+$ (Acetophenone)	$C_6H_5COCH_3$	C_6H_5	13.7	SL	221	298
$C_2H_3O^+$ (Acetophenone)	C_6H_5COCH	C_6H_5	11.40 ± 0.28	LE	168	2174
$C_2H_3O^+$	CH_3COOH	OH	11.85	SL	160	298
$C_2H_3O^+$	CH_3COOH	OH	12.68	LE	179	171
$C_2H_3O^+$	CH_3COCHO	CHO	10.65 ± 0.12	EVD	184	128
$C_2H_3O^+$	$CH_3COCOCH_3$	CH_3CO	9.88	PI	154*	1099
$C_2H_3O^+$	$CH_3COCOCH_3$	CH_3CO	10.55 ± 0.13	EVD	170	128
$C_2H_3O^+$	$CH_3COCOCH_3$	CH_3CO	10.50	SL	169	298
$C_2H_3O^+$	$CH_3COCOCH_3$	$CH_3 + CO$	11.51 ± 0.15	EVD	181	128
$C_2H_3O^+$	$CH_3COOC_2H_5$	C_2H_5O	12.05	SL	180	298
$C_2H_3O^+$	$CH_3COOC_2H_5$	C_2H_5O	12.23 ± 0.1	VC	184	1059
$C_2H_3O^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$	$CH_2 + CH_3O$	13.1 ± 0.2	EVD	166	153
$C_2H_3O^+$	CH_3COCHN_2	CHN_2	10.46 ± 0.05	VC		2174
$C_2H_3O^+$	CH_3COF	F	12.3	SL	160	298
$C_2H_3O^+$	CH_3COCF_3	CF_3	11.45	SL	160	298
$C_2H_3O^+$	CH_3COCl	Cl	11.20	SL	171	298
$C_2H_3O^+$	CH_3COCH_2Cl	CH_2Cl	10.29 ± 0.04	VC	152	2174
$C_2H_3O^+$	CH_3COBr	Br	10.60	SL	171	298
$C_3D_3O^+$						
$C_2D_3O^+$	CD_3COOH	OH	12.97	LE		171

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CH_3CHO^+ Heat of formation 196 kcal mol^{-1}				
		***cyclo*-$C_2H_4O^+$ 231 kcal mol^{-1}**				
C_2H_4O	CH_3CHO		10.21 ± 0.01	PI	195*	182, 416
$C_2H_4O^+$	CH_3CHO		10.20 ± 0.03	PI	195*	1166
$C_2H_4O^+$	CH_3CHO		10.25 ± 0.03	PI	197*	86
$C_2H_4O^+$	CH_3CHO		10.21	RPD	196	286
$C_2H_4O^+$	CH_3CHO		12.37	RPD		286
$C_2H_4O^+$	CH_3CHO		14.48	RPD		286
$C_2H_4O^+$	CH_3CHO		10.50 ± 0.05	EVD	202	127
$C_2H_4O^+$	CH_3CHO		10.25 ± 0.08	EVD	197	130
$C_2H_4O^+$	CH_3CHO		10.25 ± 0.01	CS	197	2026
$C_2H_4O^+$	CH_3CHO		10.2 ± 0.1	MSD	195	1404
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		10.565	S	231*	101
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		10.565 ± 0.01	PI	231*	101, 416
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		10.70 ± 0.02	PI		101
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		10.49	PE	229	1130
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		11.48	PE		1130
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		13.48	PE		1130
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		16.16	PE		1130
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		20.16?	PE		1130
$C_2H_4O^+$ (Ethylene oxide)	C_2H_4O		10.65 ± 0.1	EVD	233	50
		$C_2H_5O^+$				
$C_2H_5O^+$	C_2H_5OH	H	11.12	RPD	148	97
$C_2H_5O^+$	C_2H_5OH	H	10.9 ± 0.1	VC	143	1100
$C_2H_5O^+$	C_2H_5OH	H	10.95	LE	144	46
$C_2H_5O^+$	CH_3OCH_3	H	11.42 ± 0.01	RPD	167	1139
$C_2H_5O^+$	CH_3OCH_3	H	11.0 ± 0.1	VC	158	1100
$C_2H_5O^+$	*n*-C_3H_7OH	CH_3	11.95	RPD	180	97
$C_2H_5O^+$	*n*-C_3H_7OH	CH_3	11.1	LE	161	46
$C_2H_5O^+$	*iso*-C_3H_7OH	CH_3	11.39	RPD	164	97
$C_2H_5O^+$	*iso*-C_3H_7OH	CH_3	10.9	LE	153	46
$C_2H_5O^+$	$CH_3OC_2H_5$	CH_3	11.25 ± 0.07	RPD	174	1139
$C_2H_5O^+$	$C_2H_5OC_2H_5$	C_2H_5	13.23 ± 0.04	EVD	220	2196
$C_2H_5O^+$	$C_2H_5OC_2H_5$	C_2H_5	12.3 ± 0.1	VC	198	1100
$C_2H_5O^+$	$HCOOC_2H_5$	HCO	11.55 ± 0.1	SL	182	210
$C_2H_5O^+$	$HCOOC_2H_5$	HCO	11.4 ± 0.1	VC	178	1100
$C_2H_5O^+$	$DCOOC_2H_5$	DCO	11.55 ± 0.1	SL		210
$C_2H_5O^+$	$(CH_3O)_2CH_2$	CH_3O	11.41 ± 0.03	RPD	178	1139
$C_2H_5O^+$	$HCOOCH(CH_3)_2$	CH_3CO	11.53 ± 0.1	SL	173	210
$C_2H_5O^+$	$CH_3COOC_2H_5$	CH_3CO	10.8 ± 0.1	VC	147	1100
$C_2H_5O^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$		12.1 ± 0.15	EVD		153
		$C_2H_4DO^+$				
$C_2H_4DO^+$	$DCOOC_2H_5$	HCO?	12.33 ± 0.1	SL		210

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_5OH^+$ Heat of formation 185 kcal mol^{-1} $CH_3OCH_3^+$ 186 kcal mol^{-1}				
$C_2H_6O^+$	C_2H_5OH		10.48 ± 0.05	PI	185*	182
$C_2H_6O^+$	C_2H_5OH		10.50 ± 0.05	PI	186*	416
$C_2H_6O^+$	C_2H_5OH		10.63	PE	189	1130
$C_2H_6O^+$	C_2H_5OH		11.81	PE		1130
$C_2H_6O^+$	C_2H_5OH		12.80	PE		1130
$C_2H_6O^+$	C_2H_5OH		15.69	PE		1130
$C_2H_6O^+$	C_2H_5OH		17.38	PE		1130
$C_2H_6O^+$	C_2H_5OH		20.12	PE		1130
$C_2H_6O^+$	C_2H_5OH		10.72	RPD	191	97
$C_2H_6O^+$	C_2H_5OH		10.4	RPD	184	2060
$C_2H_6O^+$	C_2H_5OH		11.9	RPD		2060
$C_2H_6O^+$	C_2H_5OH		12.7	RPD		2060
$C_2H_6O^+$	C_2H_5OH		13.8	RPD		2060
$C_2H_6O^+$	C_2H_5OH		10.5	RPD	186	28
$C_2H_6O^+$	C_2H_5OH		11.7	RPD		28
$C_2H_6O^+$	C_2H_5OH		12.7	RPD		28
$C_2H_6O^+$	C_2H_5OH		13.6	RPD		28
$C_2H_6O^+$	C_2H_5OH		11.0	RPD		2018
$C_2H_6O^+$	C_2H_5OH		11.3	RPD		2018
$C_2H_6O^+$	C_2H_5OH		11.7	RPD		2018
$C_2H_6O^+$	C_2H_5OH		12.4	RPD		2018
$C_2H_6O^+$	C_2H_5OH		13.3	RPD		2018
$C_2H_6O^+$	C_2H_5OH		13.6	RPD		2018
$C_2H_6O^+$	C_2H_5OH		10.65 ± 0.05	CS	189	383, 384
$C_2H_6O^+$	C_2H_5OH		10.7	LE	191	46
$C_2H_6O^+$	CH_3OCH_3		9.96 ± 0.05	S	186*	2170
$C_2H_6O^+$	CH_3OCH_3		10.00 ± 0.02	PI	187*	182, 416
$C_2H_6O^+$	CH_3OCH_3		10.5	RPD		2018
$C_2H_6O^+$	CH_3OCH_3		11.0	RPD		2018
$C_2H_6O^+$	CH_3OCH_3		11.8	RPD		2018
$C_2H_6O^+$	CH_3OCH_3		13.0	RPD		2018
$C_2H_6O^+$	CH_3OCH_3		14.0	RPD		2018
$C_2H_6O^+$	CH_3OCH_3		10.22	TC	192	136
		C_3HO^+				
C_3HO^+	$CH_3COC{\equiv}CH$	CH_3	11.0	SL	231	298
		$C_3H_3O^+$				
$C_3H_3O^+$	$CH_3COCH{=}CH_2$	CH_3	10.85	SL	190	298
		$C_2H_3CHO^+$ Heat of formation 210 kcal mol^{-1}				
$C_3H_4O^+$	$CH_2{=}CHCHO$		10.10 ± 0.01	PI	210*	182, 416
$C_3H_4O^+$	$CH_2{=}CHCHO$		10.14 ± 0.06	EVD	211	130
$C_3H_4O^+$	$CH_2{=}CHCHO$		10.25 ± 0.05	CS	213	384
$C_3H_4O^+$	CH_3COCHN_2	N_2	9.86 ± 0.03	VC		2174

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_5CO^+$ Heat of formation 143 kcal mol^{-1}						
$C_3H_5O^+$ (Propylene oxide)	C_3H_6O	H	11.5 ± 0.3	EVD	191	50
$C_3H_5O^+$	$CH_3COC_2H_5$	CH_3	10.16	PI	143*	95
$C_3H_5O^+$	$CH_3COC_2H_5$	CH_3	10.18	PI	143*	1099
$C_3H_5O^+$	$CH_3COC_2H_5$	CH_3	10.45	SL	150	298
$C_3H_5O^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$	CH_3O	11.2 ± 0.2	EVD	216	153
$C_3H_5O^+$	$C_2H_5COCOH_3$	$COCH_3$	9.67	PI	144*	1099
$C_3H_5O^+$ (Epichlorohydrin)	C_3H_5OCl	Cl	11.4 ± 0.3	EVD	207	153
$C_3H_5O^+$ (Epibromohydrin)	C_3H_5OBr	Br	10.8 ± 0.1	EVD	207	153
$C_2H_5CHO^+$ Heat of formation 181 kcal mol^{-1}						
$CH_3COCH_3^+$			**171 kcal mol^{-1}**			
$CH_2{=}CHCH_2OH^+$			**191 kcal mol^{-1}**			
$CH_2{=}CHOCH_3^+$			**178 kcal mol^{-1}**			
$C_3H_6O^+$ (Propylene oxide)			**214 kcal mol^{-1}**			
$C_3H_6O^+$ (Trimethylene oxide)			**199 kcal mol^{-1}**			
$C_3H_6O^+$	C_2H_5CHO		9.98 ± 0.01	PI	181*	182
$C_3H_6O^+$	C_2H_5CHO		10.14 ± 0.10	EVD	185	130
$C_3H_6O^+$	CH_3COCH_3		9.69 ± 0.01	PI	172*	182, 416
$C_3H_6O^+$	CH_3COCH_3		9.68 ± 0.02	PI	171*	95
$C_3H_6O^+$	CH_3COCH_3		11.6	PI		95
$C_3H_6O^+$	CH_3COCH_3		9.71 ± 0.03	PI	172*	1166
$C_3H_6O^+$	CH_3COCH_3		9.65 ± 0.1	PI	171*	86
$C_3H_6O^+$	CH_3COCH_3		9.67	PE	171	1130
$C_3H_6O^+$	CH_3COCH_3		12.16	PE		1130
$C_3H_6O^+$	CH_3COCH_3		14.15?	PE		1130
$C_3H_6O^+$	CH_3COCH_3		15.55	PE		1130
$C_3H_6O^+$	CH_3COCH_3		17.92?	PE		1130
$C_3H_6O^+$	CH_3COCH_3		19.88	PE		1130
$C_3H_6O^+$	CH_3COCH_3		9.80 ± 0.05	VC	174	2174
$C_3H_6O^+$	CH_3COCH_3		9.84 ± 0.03	CS	175	2026
$C_3H_6O^+$	CH_3COCH_3		9.89 ± 0.05	CS	176	384
$C_3H_6O^+$	CH_3COCH_3		9.7 ± 0.1	MSD	172	1404
$C_3H_6O^+$	CH_3COCH_3		9.73	LE	173	1254, 1256
$C_3H_6O^+$	$CH_2{=}CHCH_2OH$		9.67 ± 0.05	PI	191*	182
$C_3H_6O^+$	$CH_2{=}CHOCH_3$		8.93 ± 0.02	PI	178*	182
$C_3H_6O^+$	$CH_2{=}CHOCH_3$		9.97	TC	202	136
$C_3H_6O^+$ (Propylene oxide)	C_3H_6O		10.22 ± 0.02	PI	214*	182
$C_3H_6O^+$ (Propylene oxide)	C_3H_6O		9.80 ± 0.1	EVD	204	50
$C_3H_6O^+$ (Trimethylene oxide)	$(CH_2)_3O$		9.667 ± 0.005	S	199*	2169
$C_3H_6O^+$ (Trimethylene oxide)	$(CH_2)_3O$		9.85 ± 0.15	EVD	203	52
$C_3H_6O^+$ (Trimethylene oxide)	$(CH_2)_3O$		9.7	EC	200	218

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_3H_6O^+$	n-$C_3H_7COCH_3$	C_2H_4	10.07	PI	158	95
$C_3H_6O^+$	n-$C_4H_9COCH_3$	C_3H_6	10.00	PI	159	95
$C_3H_6O^+$	*iso*-$C_4H_9COCH_3$	C_3H_6	10.1	PI	160	95
$C_3H_6O^+$ (1,2-Epoxy-3-methoxypropane)	$C_4H_8O_2$	CH_2O	10.2 ± 0.2	EVD	220	153
		$C_3H_7O^+$				
$C_3H_7O^+$	n-C_3H_7OH	H	11.00	PI	140	11
$C_3H_7O^+$	n-C_3H_7OH	H	10.69	RPD	133	97
$C_3H_7O^+$	n-C_3H_7OH	H	11.2	LE	144	46
$C_3H_7O^+$	*iso*-C_3H_7OH	H	11.85	RPD	156	97
$C_3H_7O^+$	*iso*-C_3H_7OH	H	11.3	LE	143	46
$C_3H_7O^+$	$C_2H_5OC_2H_5$	CH_3	10.80 ± 0.08	EVD	156	2196
$C_3H_7O^+$	$(CH_3O)_2CHCH_3$	CH_3O	10.63 ± 0.04	RPD	153	1139
		n-$C_3H_7OH^+$ Heat of formation 172 kcal mol^{-1}				
		***iso*-$C_3H_7OH^+$ 169 kcal mol^{-1}**				
$C_3H_8O^+$	n-C_3H_7OH		10.20	PI	173*	182
$C_3H_8O^+$	n-C_3H_7OH		10.1	PI	171*	11
$C_3H_8O^+$	n-C_3H_7OH		10.1	PI	171	86
$C_3H_8O^+$	n-C_3H_7OH		10.37	RPD	177	97
$C_3H_8O^+$	n-C_3H_7OH		10.5	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		11.1	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		11.6	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		12.2	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		13.0	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		13.6	RPD		2018
$C_3H_8O^+$	n-C_3H_7OH		10.42 ± 0.10	CS	178	384
$C_3H_8O^+$	n-C_3H_7OH		10.9	LE	189	46
$C_3H_8O^+$	*iso*-C_3H_7OH		10.15 ± 0.05	PI	169*	416
$C_3H_8O^+$	*iso*-C_3H_7OH		10.16	PI	169*	182
$C_3H_8O^+$	*iso*-C_3H_7OH		10.41	RPD	175	97
$C_3H_8O^+$	*iso*-C_3H_7OH		10.27 ± 0.10	CS	171	384
		$C_4H_4O^+$ (Furan) Heat of formation 197 kcal mol^{-1}				
$C_4H_4O^+$ (Furan)	C_4H_4O		8.89	S	197*	161
$C_4H_4O^+$ (Furan)	C_4H_4O		9.95	S		161
$C_4H_4O^+$ (Furan)	C_4H_4O		8.89 ± 0.01	PI	197*	161, 182, 416
$C_4H_4O^+$ (Furan)	C_4H_4O		9.04 ± 0.09	SL	200	411
$C_4H_4O^+$ (Furan)	C_4H_4O		9.00 ± 0.10	CS	199	383, 381
$C_4H_4O^+$ (Furan)	C_4H_4O		8.93	TC	198	136
		$CH_3CH{=}CHCHO^+$ Heat of formation 194 kcal mol^{-1}				
$C_4H_6O^+$	$CH_3CH{=}CHCHO$		9.73 ± 0.01	PI	194*	182, 416
$C_4H_6O^+$	$CH_3CH{=}CHCHO$		9.81 ± 0.05	CS	196	384
$C_4H_6O^+$ (3,4-Epoxy-1-butene)	C_4H_6O		9.7 ± 0.3	EVD	234	153

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_7O^+$				
$C_4H_7O^+$	n-$C_3H_7COCH_3$	CH_3	10.03	PI	136*	95
$C_4H_7O^+$	*iso*-$C_3H_7COCH_3$	CH_3	9.94	PI	133*	95
$C_4H_7O^+$	n-$C_4H_9COCH_3$	C_2H_5	10.03	PI	140*	95
$C_4H_7O^+$ (Tetrahydrofuran)	$(CH_2)_4O$	H	11.1 ± 0.2	EVD	161	52
		n-$C_3H_7CHO^+$ Heat of formation 174 kcal mol^{-1}				
		***iso*-$C_3H_7CHO^+$ 169 kcal mol^{-1}**				
		$C_2H_5COCH_3^+$ 161 kcal mol^{-1}				
		***cyclo*-$C_4H_8O^+$ 174 kcal mol^{-1}**				
$C_4H_8O^+$	n-C_3H_7CHO		9.86 ± 0.02	PI	174*	182
$C_4H_8O^+$	*iso*-C_3H_7CHO		9.74 ± 0.03	PI	169*	182
$C_4H_8O^+$	$C_2H_5COCH_3$		9.53 ± 0.01	PI	162*	182
$C_4H_8O^+$	$C_2H_5COCH_3$		9.48 ± 0.02	PI	160*	95
$C_4H_8O^+$	$C_2H_5COCH_3$		11.3	PI		95
$C_4H_8O^+$	$C_2H_5COCH_3$		9.54 ± 0.02	PI	162*	416
$C_4H_8O^+$	$C_2H_5COCH_3$		9.55 ± 0.03	PI	162*	1166
$C_4H_8O^+$	$C_2H_5COCH_3$		9.45 ± 0.1	PI	160*	86
$C_4H_8O^+$	$C_2H_5COCH_3$		9.58 ± 0.09	SL	163	411
$C_4H_8O^+$ (Tetrahydrofuran)	$(CH_2)_4O$		9.42 ± 0.01	S	174*	2169
$C_4H_8O^+$ (Tetrahydrofuran)	$(CH_2)_4O$		9.54	PI	177	182
$C_4H_8O^+$ (Tetrahydrofuran)	$(CH_2)_4O$		9.45 ± 0.15	EVD	175	52
$C_4H_8O^+$ (Tetrahydrofuran)	$(CH_2)_4O$		9.3	EC	171	218
$C_4H_8O^+$ (Tetrahydrofuran)	$(CH_2)_4O$		9.53	TC	177	1077
		$C_4H_9O^+$				
$C_4H_9O^+$	$(CH_3O)_2C(CH_3)_2$	CH_3O	10.28 ± 0.05	RPD	144	1139
		n-$C_4H_9OH^+$ Heat of formation 165 kcal mol^{-1}				
		$C_2H_5OC_2H_5^+$ 161 kcal mol^{-1}				
$C_4H_{10}O^+$	n-C_4H_9OH		10.04	PI	165*	182
$C_4H_{10}O^+$	n-C_4H_9OH		10.56	RPD	177	97
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		9.53 ± 0.02	PI	160*	416, 182
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		9.65 ± 0.03	PI	162*	1166
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		9.61	PE	161	1130
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		11.08	PE		1130
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		11.92?	PE		1130
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		16.23	PE		1130
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		19.67?	PE		1130
$C_4H_{10}O^+$	$C_2H_5OC_2H_5$		9.55 ± 0.02	EVD	160	2196
		$C_5H_6O^+$				
$C_5H_6O^+$ (2-Methylfuran)	C_5H_6O		8.39 ± 0.01	PI	177*	182
$C_5H_6O^+$ (2-Methylfuran)	C_5H_6O		8.31 ± 0.09	SL	176	411
$C_5H_6O^+$ (2-Methylfuran)	C_5H_6O		8.58	TC	182	136

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_8O^+$				
$C_5H_8O^+$ (Cyclopentanone)	C_5H_8O		9.26 ± 0.01	PI	167*	182
$C_5H_8O^+$ (Dihydropyran)	C_5H_8O		8.34 ± 0.01	PI	164*	182
$C_5H_8O^+$ (Dihydropyran)	C_5H_8O		9.45	CTS	189	2031
		$C_5H_9O^+$				
$C_5H_9O^+$	n-$C_4H_9COCH_3$	CH_3	9.66	PI	123*	95
$C_5H_9O^+$	*iso*-$C_4H_9COCH_3$	CH_3	9.80	PI	125*	95
		n-$C_4H_9CHO^+$ Heat of formation 168 kcal mol^{-1}				
		***iso*-$C_4H_9CHO^+$ 164 kcal mol^{-1}**				
		n-$C_3H_7COCH_3^+$ 154 kcal mol^{-1}				
		***iso*-$C_3H_7COCH_3^+$ 151 kcal mol^{-1}**				
		$(C_2H_5)_2CO^+$ 153 kcal mol^{-1}				
		***cyclo*-$C_5H_{10}O^+$ 161 kcal mol^{-1}**				
$C_5H_{10}O^+$	n-C_4H_9CHO		9.82 ± 0.05	PI	168*	182
$C_5H_{10}O^+$	*iso*-C_4H_9CHO		9.71 ± 0.05	PI	164*	182
$C_5H_{10}O^+$	n-$C_3H_7COCH_3$		9.37 ± 0.02	PI	154*	95
$C_5H_{10}O^+$	n-$C_3H_7COCH_3$		10.7	PI		95
$C_5H_{10}O^+$	n-$C_3H_7COCH_3$		9.39 ± 0.02	PI	155*	182
$C_5H_{10}O^+$	$C_3H_7COCH_3$		9.47 ± 0.03	PI	157	1166
$C_5H_{10}O^+$	*iso*-$C_3H_7COCH_3$		9.30 ± 0.02	PI	151*	95
$C_5H_{10}O^+$	*iso*-$C_3H_7COCH_3$		10.7	PI		95
$C_5H_{10}O^+$	*iso*-$C_3H_7COCH_3$		9.32 ± 0.02	PI	152*	182
$C_5H_{10}O^+$	$C_2H_5COC_2H_5$		9.32 ± 0.01	PI	153*	182
$C_5H_{10}O^+$ (Tetrahydropyran)	$(CH_2)_5O$		9.25 ± 0.01	S	161*	2169
$C_5H_{10}O^+$ (Tetrahydropyran)	$(CH_2)_5O$		9.26 ± 0.03	PI	162	182
$C_5H_{10}O^+$ (Tetrahydropyran)	$(CH_2)_5O$		9.7	EC	172	218
$C_5H_{10}O^+$ (Tetrahydropyran)	$(CH_2)_5O$		9.25	TC	161	1077
		$C_6H_5O^+$				
$C_6H_5O^+$ (Phenoxy radical)	C_6H_5O		8.84	SL	(a)	1079
$C_6H_5O^+$ (Anisole)	$C_6H_5OCH_3$	CH_3	11.92 ± 0.1	SL	226*	1079
$C_6H_5O^+$ (Phenoxyacetylene)	$C_6H_5OC{\equiv}CH$	C_2H	9.5 ± 0.1	VC		13

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_6O^+$ (Phenol) Heat of formation 173 kcal mol^{-1}						
$C_6H_6O^+$	C_6H_5OH		8.50 ± 0.01	PI	173*	182, 416
$C_6H_6O^+$ (Phenol)	C_6H_5OH		8.52 ± 0.02	PI	173*	1166
$C_6H_6O^+$ (Phenol)	C_6H_5OH		9.16	SL	188	1066
$C_6H_6O^+$ (Phenol)	C_6H_5OH		9.03	TC	185	136
$C_6H_6O^+$ (Phenyl ether)	$(C_6H_5)_2O$	C_6H_4	13.88 ± 0.15	SL	(b)	1237
$C_6H_8O^+$						
$C_6H_8O^+$ (2,3-Dimethylfuran)	C_6H_8O		8.01 ± 0.09	SL	161*	411
$(CH_3)_2C{=}CHCOCH_3^+$ Heat of formation 168 kcal mol^{-1}						
***cyclo*-$C_6H_{10}O^+$ 157 kcal mol^{-1}**						
$C_6H_{10}O^+$	$(CH_3)_2C{=}CHCOCH_3$		9.08 ± 0.03	PI	168*	182
$C_6H_{10}O^+$	$(CH_3)_2C{=}CHCOCH_3$		8.89 ± 0.05	CS	163	384
$C_6H_{10}O^+$ (Cyclohexanone)	$C_6H_{10}O$		9.14 ± 0.01	PI	157*	182
$C_6H_{10}O^+$ (Cyclohexanone)	$C_6H_{10}O$		9.91 ± 0.05	CS	174	431
$C_6H_{10}O^+$ (Cyclohexanone)	$C_6H_{10}O$		9.83 ± 0.05	LE	173	431
***n*-$C_4H_9COCH_3^+$ Heat of formation 149 kcal mol^{-1}**						
***iso*-$C_4H_9COCH_3^+$ 147 kcal mol^{-1}**						
***tert*-$C_4H_9COCH_3^+$ 140 kcal mol^{-1}**						
$C_6H_{12}O^+$	*n*-$C_4H_9COCH_3$		9.37 ± 0.02	PI	150*	95
$C_6H_{12}O^+$	*n*-$C_4H_9COCH_3$		10.6	PI		95
$C_6H_{12}O^+$	*n*-$C_4H_9COCH_3$		9.34 ± 0.03	PI	149*	182
$C_6H_{12}O^+$	*n*-$C_4H_9COCH_3$		9.77	LE	159	1256
$C_6H_{12}O^+$	*n*-$C_4H_9COCH_3$		9.70	TC	157	1256
$C_6H_{12}O^+$	*sec*-$C_4H_9COCH_3$		9.69	LE	156	1254
$C_6H_{12}O^+$	*sec*-$C_4H_9COCH_3$		9.657	TC	155	1254
$C_6H_{12}O^+$	*iso*-$C_4H_9COCH_3$		9.30 ± 0.02	PI	147*	95
$C_6H_{12}O^+$	*iso*-$C_4H_9COCH_3$		10.6	PI		95
$C_6H_{12}O^+$	*iso*-$C_4H_9COCH_3$		9.30 ± 0.03	PI	147*	182
$C_6H_{12}O^+$	*iso*-$C_4H_9COCH_3$		9.33	LE	147	1256
$C_6H_{12}O^+$	*iso*-$C_4H_9COCH_3$		9.69	TC	156	1256
$C_6H_{12}O^+$	*tert*-$C_4H_9COCH_3$		9.17 ± 0.03	PI	140*	182
$C_6H_{12}O^+$	*tert*-$C_4H_9COCH_3$		9.51	LE	148	1254
$C_6H_{12}O^+$	*tert*-$C_4H_9COCH_3$		9.637	TC	151	1254
$C_6H_7D_5O^+$						
$C_6H_7D_5O^+$	*iso*-$C_3H_7CD_2COCD_3$		9.35	LE		1256
$C_6H_7D_5O^+$	*iso*-$C_3H_7CD_2COCD_3$		9.69	TC		1256

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_6H_{14}O^+$				
$C_6H_{14}O^+$	$(n\text{-}C_3H_7)_2O$		9.27 ± 0.05	PI	147*	182
$C_6H_{14}O^+$	$(iso\text{-}C_3H_7)_2O$		9.20 ± 0.05	PI	142*	182
		$C_7H_5O^+$				
$C_7H_5O^+$ (Benzaldehyde)	C_6H_5CHO	H	11.21 ± 0.08	EVD	196	130
$C_7H_5O^+$ (Benzaldehyde)	C_6H_5CHO	H	11.35 ± 0.05	SL	199	1237
$C_7H_5O^+$ (Benzaldehyde)	C_6H_5CHO	H	11.1	SL	193	308
$C_7H_5O^+$ (Acetophenone)	$C_6H_5COCH_3$	CH_3	10.43 ± 0.05	SL	184	1237
$C_7H_5O^+$ (Acetophenone)	$C_6H_5COCH_3$	CH_3	10.5	SL	186	308
$C_7H_5O^+$ (Acetophenone)	$C_6H_5COCH_3$	CH_3	9.70 ± 0.09	VC	168	2174
$C_7H_5O^+$ (Trideuteroacetophenone)	$C_6H_5COCD_3$	CD_3	10.45	SL		308
$C_7H_5O^+$ (Benzophenone)	$(C_6H_5)_2CO$	C_6H_5	12.00 ± 0.05	SL	217	1237
$C_7H_5O^+$ (Methyl benzoate)	$C_6H_5COOCH_3$	CH_3O	11.4	SL	192	308
$C_7H_5O^+$ (Phenyl benzoate)	$(C_6H_5)_2CO_2$	C_6H_5O	10.01 ± 0.07	SL		1237
$C_7H_5O^+$ (Benzil)	$(C_6H_5)_2C_2O_2$	C_6H_5CO	9.70 ± 0.05	SL		1237
$C_7H_5O^+$ (Benzamide)	$C_6H_5CONH_2$	NH_2	9.9 ± 0.1	SL	165	1168
$C_7H_5O^+$ (Diazoacetophenone)	$C_6H_5COCHN_2$	CHN_2	10.42 ± 0.18	VC		2174
$C_7H_5O^+$ (2,5-Diphenyl-1,3,4-oxadiazole)	$(C_6H_5)_2C_2N_2O$		12.1 ± 0.2	SL		1125
$C_7H_5O^+$ (Benzoyl fluoride)	C_6H_5COF	F	11.5	SL		308
$C_7H_5O^+$ (Trifluoroacetophenone)	$C_6H_5COCF_3$	CF_3	10.05	SL		308
$C_7H_5O^+$ (Benzoyl chloride)	C_6H_5COCl	Cl	11.18 ± 0.10	EVD	200	130
$C_7H_5O^+$ (Benzoyl chloride)	C_6H_5COCl	Cl	10.5	SL	184	308
$C_7H_5O^+$ (Benzoyl bromide)	C_6H_5COBr	Br	10.0	SL	189	308
		$C_7H_6O^+$ (Benzaldehyde) Heat of formation 209 kcal mol^{-1}				
		$C_7H_6O^+$ (Tropone) 240 kcal mol^{-1}				
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.51 ± 0.02	PI	209*	416
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.60 ± 0.02	PI	211	1166
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.53 ± 0.03	PI	209*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.90 ± 0.02	EVD	218	127
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.63 ± 0.09	EVD	212	130
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.51 ± 0.05	SL	209	1237
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		10.1	SL	222	308
$C_7H_6O^+$ (Benzaldehyde)	C_6H_5CHO		9.73 ± 0.03	CS	214	2026
$C_7H_6O^+$ (Tropone)	C_7H_6O		9.68 ± 0.02	CS	240*	431
$C_7H_6O^+$ (Tropone)	C_7H_6O		9.69 ± 0.02	LE	240	431
		$C_7H_7O^+$				
$C_7H_7O^+$ (*p*-Hydroxybenzyl radical)	$C_6H_4OHCH_2$		7.58	TC		136
		***cyclo*-$C_6H_5CH_2OH^+$ Heat of formation 186 kcal mol^{-1}**				
		***cyclo*-$C_6H_5OCH_3^+$ 173 kcal mol^{-1}**				
		$C_7H_8O^+$(*m*-Cresol) 165 kcal mol^{-1}				
$C_7H_8O^+$ (Benzyl alcohol)	$C_6H_5CH_2OH$		9.14 ± 0.05	CS	186*	2025
$C_7H_8O^+$ (Anisole)	$C_6H_5OCH_3$		8.20 ± 0.02	PI	173*	416
$C_7H_8O^+$ (Anisole)	$C_6H_5OCH_3$		8.22 ± 0.02	PI	173*	182
$C_7H_8O^+$ (Anisole)	$C_6H_5OCH_3$		8.83	SL	188	1066
$C_7H_8O^+$ (Anisole)	$C_6H_5OCH_3$		9.01	TC	192	136
$C_7H_8O^+$ (*o*-Cresol)	$C_6H_4OHCH_3$		8.93	SL	175	1066
$C_7H_8O^+$ (*m*-Cresol)	$C_6H_4OHCH_3$		8.98	SL	175	1066
$C_7H_8O^+$ (*m*-Cresol)	$C_6H_4OHCH_3$		8.52 ± 0.05	CS	165*	2025
$C_7H_8O^+$ (*p*-Cresol)	$C_6H_4OHCH_3$		8.97	SL	177	1066
$C_7H_8O^+$ (Cresol)	$C_6H_4OHCH_3$		8.87	TC	175	2194
		$C_7H_{14}O^+$				
$C_7H_{14}O^+$	n-$C_5H_{11}COCH_3$		9.33 ± 0.03	PI	143*	182
		$C_8H_6O^+$				
$C_8H_6O^+$ (Benzofuran)	C_8H_6O		8.67	TC		136
$C_8H_6O^+$ (Diazoacetophenone)	$C_6H_5COCHN_2$	N_2	10.08 ± 0.11	VC		2174

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_7O^+$				
$C_8H_7O^+$ (Benzyl methyl ketone)	$C_6H_5CH_2COCH_3$	CH_3	9.90 ± 0.17	VC	170	2174
		$C_8H_8O^+$ (Acetophenone) Heat of formation 191 kcal mol^{-1}				
		$C_8H_8O^+$ (*p*-Methylbenzaldehyde) 194 kcal mol^{-1}				
$C_8H_8O^+$ (Acetophenone)	$C_6H_5COCH_3$		9.27 ± 0.03	PI	191*	182
$C_8H_8O^+$ (Acetophenone)	$C_6H_5COCH_3$		9.48 ± 0.05	SL	196	1237
$C_8H_8O^+$ (Acetophenone)	$C_6H_5COCH_3$		9.7	SL	201	308
$C_8H_8O^+$ (Acetophenone)	$C_6H_5COCH_3$		9.34 ± 0.04	VC	192	2174
$C_8H_8O^+$	$C_6H_5COCH_3$		9.32 ± 0.02	CS	192	2026, 2025
$C_8H_8O^+$ (*p*-Methylbenzaldehyde)	$C_6H_4CH_3CHO$		9.33 ± 0.05	CS	194*	2026
$C_8H_8O^+$ (Methylbenzaldehyde)	$C_6H_4CH_3CHO$		9.31	TC	194	2194
		$C_8H_9O^+$				
$C_8H_9O^+$ (*m*-Methoxybenzyl radical)	$C_6H_4OCH_3CH_2$		7.66	TC	180	136
$C_8H_9O^+$ (*p*-Methoxybenzyl radical)	$C_6H_4OCH_3CH_2$		6.82 ± 0.1	SL	160	69
$C_8H_9O^+$ (*p*-Methoxybenzyl radical)	$C_6H_4OCH_3CH_2$		7.58	TC	178	136
$C_8H_9O^+$ (Benzyl methyl ether)	$C_6H_5CH_2OCH_3$	H	10.65 ± 0.1	SL	174	122
$C_8H_9O^+$ (*m*-Methylanisole)	$C_6H_4OCH_3CH_3$	H	12.13 ± 0.1	SL	205	122
$C_8H_9O^+$ (*p*-Methylanisole)	$C_6H_4OCH_3CH_3$	H	11.98 ± 0.1	SL	201	122
$C_8H_9O^+$ (7-Methoxycycloheptatriene)	$C_7H_7OCH_3$	H	9.70 ± 0.1	SL	177	122
$C_8H_9O^+$ (*p*-Ethylanisole)	$C_6H_4OCH_3C_2H_5$	CH_3	10.80 ± 0.1	SL	188	122
		$C_8H_7D_2O^+$				
$C_8H_7D_2O^+$ (*m*-Methyl-d_3-anisole)	$C_6H_4OCH_3CD_3$	D	12.10 ± 0.1	SL		122
$C_8H_7D_2O^+$ (*p*-Methyl-d_3-anisole)	$C_6H_4OCH_3CD_3$	D	12.10 ± 0.1	SL		122
		$C_8H_6D_3O^+$				
$C_8H_6D_3O^+$ (*m*-Methyl-d_3-anisole)	$C_6H_4OCH_3CD_3$	H	12.10 ± 0.1	SL		122
$C_8H_6D_3O^+$ (*p*-Methyl-d_3-anisole)	$C_6H_4OCH_3CD_3$	H	12.10 ± 0.1	SL		122
$C_8H_6D_3O^+$ (*m*-Methoxy-d_3-ethylbenzene)	$C_6H_4OCD_3C_2H_5$	CH_3	11.70 ± 0.1	SL		122
$C_8H_6D_3O^+$ (*p*-Methoxy-d_3-ethylbenzene)	$C_6H_4OCD_3C_2H_5$	CH_3	10.90 ± 0.1	SL		122

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_8H_{10}O^+$ (Benzyl methyl ether) Heat of formation 184 kcal mol^{-1}						
$C_8H_{10}O^+$ (Phenyl ethyl ether)					**167 kcal mol^{-1}**	
$C_8H_{10}O^+$ (*m*-Methylanisole)					**169 kcal mol^{-1}**	
$C_8H_{10}O^+$ (Benzyl methyl ether)	$C_6H_5CH_2OCH_3$		8.85 ± 0.03	PI	184*	416
$C_8H_{10}O^+$ (Benzyl methyl ether)	$C_6H_5CH_2OCH_3$		9.34 ± 0.1	SL	195	122
$C_8H_{10}O^+$ (Benzyl methyl ether)	$C_6H_5CH_2OCH_3$		8.83 ± 0.05	CS	184	2025
$C_8H_{10}O^+$ (Phenyl ethyl ether)	$C_6H_5OC_2H_5$		8.13 ± 0.02	PI	167*	182
$C_8H_{10}O^+$ (*m*-Methylanisole)	$C_6H_4OCH_3CH_3$		8.56 ± 0.1	SL	174	122
$C_8H_{10}O^+$ (*m*-Methylanisole)	$C_6H_4OCH_3CH_3$		8.31 ± 0.05	CS	169*	2025
$C_8H_{10}O^+$ (*p*-Methylanisole)	$C_6H_4OCH_3CH_3$		8.48 ± 0.1	SL	173	122
$C_8H_{10}O^+$ (Methylanisole)	$C_6H_4OCH_3CH_3$		8.59	TC	175	2194
$C_8H_{10}O^+$ (7-Methoxycycloheptatriene)	$C_7H_7OCH_3$		8.58 ± 0.1	SL	203	122
$C_9H_{10}O^+$						
$C_9H_{10}O^+$ (Benzyl methyl ketone)	$C_6H_5CH_2COCH_3$		9.14 ± 0.09	VC	186	2174
$C_9H_{10}O^+$ (Phenyl ethyl ketone)	$C_6H_5COC_2H_5$		9.27 ± 0.05	CS	189*	2025
$C_9H_{10}O^+$ (*m*-Methylacetophenone)	$C_6H_4COCH_3CH_3$		9.15 ± 0.05	CS	182*	2035
$C_9H_{10}O^+$ (Methylacetophenone)	$C_6H_4COCH_3CH_3$		9.03	TC	179	2194
$C_{12}H_8O^+$						
$C_{12}H_8O^+$ (Dibenzofuran)	$C_{12}H_8O$		8.59	TC		136
$C_{12}H_9O^+$						
$C_{12}H_9O^+$ (Phenyl ether)	$(C_6H_5)_2O$	H	12.90 ± 0.05	SL	262	1237
$C_{12}H_9O^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$	CO_2 + H	12.51 ± 0.05	SL	244	1237
$C_{12}H_{10}O^+$						
$C_{12}H_{10}O^+$ (Phenyl ether)	$(C_6H_5)_2O$		8.82 ± 0.05	SL	220*	1237
$C_{12}H_{10}O^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$	CO_2	10.78 ± 0.05	SL	257	1237
$C_{13}H_{10}O^+$(Benzophenone) Heat of formation 229 kcal mol^{-1}						
$C_{13}H_{10}O^+$ (Benzophenone)	$(C_6H_5)_2CO$		9.46 ± 0.05	SL	231*	1237
$C_{13}H_{10}O^+$ (Benzophenone)	$(C_6H_5)_2CO$		9.35 ± 0.04	CS	228*	2026

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{14}H_{12}O^+$				
$C_{14}H_{12}O^+$	$C_6H_4CH_3COC_6H_5$		9.13 ± 0.05	CS	214*	2026
(p-Methylbenzophenone)						
$C_{14}H_{12}O^+$	$C_6H_4CH_3COC_6H_5$		9.08	TC	213	2194
(Methylbenzophenone)						
		CHO^+_2				
CHO^+_2	CH_3COOH	CH_3	14.15	LE	189	171
CHO^+_2	CD_3COOH	CD_3	14.08	LE		171
		$CH_2O^+_2$				
$CH_2O^+_2$	HCOOH		11.05 ± 0.01	PI	164*	182, 416
$CH_2O^+_2$	HCOOH		11.44 ± 0.08	EVD	173	127
		$CH_3O^+_2$				
$CH_3O^+_2$	$HCOOC_2H_5$	C_2H_3	11.60 ± 0.1	SL	114	210
$CH_3O^+_2$	$HCOOC_2H_5$	C_2H_3	11.73 ± 0.1	VC	116	1059
$CH_3O^+_2$	$HCOOC_2H_5$	C_2H_3	11.3 ± 0.1	VC	107	1100
$CH_3O^+_2$	$HCOOC_3H_7$	$CH_3C{=}CH_2$?	11.0 ± 0.1	VC	102	1100
		$C_2H_2O^+_2$				
$C_2H_2O^+_2$	CHOCHO		9.48 ± 0.08	EVD	145*	128
$C_2H_2O^+_2$	CHOCHO		10.25 ± 0.20	EVD		128
		$C_2H_3O^+_2$				
$C_2H_3O^+_2$	$HCOOC_2H_5$	CH_3	11.51 ± 0.1	VC	143	1059
CH_3COOH^+		**Heat of formation 135 kcal mol^{-1}**				
$HCOOCH^+_3$		**166 kcal mol^{-1}**				
$C_2H_4O^+_2$	CH_3COOH		10.35 ± 0.03	PI	135*	416
$C_2H_4O^+_2$	CH_3COOH		10.37 ± 0.03	PI	135*	182
$C_2H_4O^+_2$	CH_3COOH		10.88 ± 0.01	CS	147	2026
$C_2H_4O^+_2$	CH_3COOH		10.66 ± 0.05	CS	142	384
$C_2H_4O^+_2$	CH_3COOH		10.72	LE	143	171
$C_2H_4O^+_2$	$HCOOCH_3$		10.815 ± 0.005	PI	166*	182
$C_2H_4O^+_2$	$HCOOCH_3$		10.92 ± 0.09	SL	168	411
$C_2H_4O^+_2$	$HCOOCH_3$		11.12 ± 0.1	SL	173	210
$C_2H_4O^+_2$	$HCOOCH_3$		11.14 ± 0.03	VC	173	305
$C_2H_4O^+_2$	$HCOOCH_3$		10.4 ± 0.1	VC	156	1100
$C_2H_4O^+$	$(H_2CO)_2$		10.51 ± 0.03	PI		1166
$C_2H_4O^+_2$	$CH_3COOC_2H_5$	C_2H_4	11.15 ± 0.1	VC	138	1059
		$C_2HD_3O^+_2$				
$C_2HD_3O^+_2$	CD_3COOH		10.71	LE		171

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_5O_2^+$				
$C_2H_5O_2^+$	$CH_3COOC_2H_5$	C_2H_3	10.80 ± 0.1	SL	77	1413
$C_2H_5O_2^+$	$CH_3COOC_2H_5$	C_2H_3	10.95 ± 0.1	VC	81	1059
$C_2H_5O_2^+$	$CH_3COOC_2H_5$	C_2H_3	10.8 ± 0.1	VC	77	1100
$C_2H_5O_2^+$	$CH_3COOC_3H_7$	$CH_3C{=}CH_2$?	10.5	VC	71	1100
$C_2H_5O_2^+$	$CH_3COOCH(CH_3)_2$	$CH_3C{=}CH_2$?	10.42 ± 0.1	SL	66	1413
		$C_3H_4O_2^+$				
$C_3H_4O_2^+$	CH_3COCHO		9.60 ± 0.06	EVD	155	128
$C_3H_4O_2^+$	CH_3COCHO		10.18 ± 0.17	EVD		128
$C_3H_4O_2^+$ (Propiolactone)	$C_3H_4O_2$		9.70 ± 0.01	PI		182
		$C_3H_5O^+$ Heat of formation 113 kcal mol^{-1}				
$C_3H_5O_2^+$	$HCOOC_2H_5$	H	11.05 ± 0.1	VC	114*	1059
$C_3H_5O_2^+$	$CH_3COOC_2H_5$	CH_3	10.95 ± 0.1	VC	113*	1059
		$C_3H_4DO_2^+$				
$C_3H_4DO^+_2$	$HCOOCD_2CH_3$	D	11.05 ± 0.1	VC		1059
		$C_3H_3D_2O_2^+$				
$C_3H_3D_2O_2^+$	$HCOOCD_2CH_3$	H	10.97 ± 0.1	VC		1059
		$C_2H_5COOH^+$ Heat of formation 127 kcal mol^{-1} **$HCOOC_2H_5^+$ 156 kcal mol^{-1}** **$CH_3COOCH_3^+$ 138 kcal mol^{-1}**				
$C_3H_6O_2^+$	C_2H_5COOH		10.24 ± 0.03	PI	127*	182
$C_3H_6O_2^+$	$HCOOC_2H_5$		10.61 ± 0.01	PI	156*	182
$C_3H_6O_2^+$	$HCOOC_2H_5$		10.70 ± 0.1	SL	158	210
$C_3H_6O_2^+$	$HCOOC_2H_5$		10.16 ± 0.04	VC	145	305
$C_3H_6O_2^+$	$HCOOC_2H_5$		10.79 ± 0.1	VC	160	1059
$C_3H_6O_2^+$	$HCOOC_2H_5$		10.3 ± 0.1	VC	149	1100
$C_3H_6O_2^+$	CH_3COOCH_3		10.27 ± 0.02	PI	138*	182
$C_3H_6O_2^+$	CH_3COOCH_3		10.58 ± 0.09	VC	145	305
$C_3H_6O_2^+$	CH_3COOCH_3		10.8 ± 0.1	VC	150	1100
$C_3H_6O_2^+$	CH_3COOCH_3		10.52 ± 0.02	CS	143	2026, 2025
		$C_3H_4D_2O_2^+$				
$C_3H_4D_2O_2^+$	$HCOOCD_2CH_3$		10.75 ± 0.1	VC		1059
		$C_3H_7O_2^+$				
$C_3H_7O_2^+$	$(CH_3O)_2CH_2$	H	10.38 ± 0.03	RPD	102	1139
$C_3H_7O_2^+$	$(CH_3O)_2CHCH_3$	CH_3	10.34 ± 0.07	RPD	112	1139
$C_3H_7O_2^+$	$C_2H_5COOC_2H_5$	C_2H_3	10.67 ± 0.1	SL	68	1413
$C_3H_7O_2^+$	$C_2H_5COOC_2H_5$	C_2H_3	10.77	VC	70	1059
$C_3H_7O_2^+$	$C_2H_5COOC_2H_5$	C_2H_3	10.4 ± 0.1	VC	61	1100
$C_3H_7O_2^+$	$C_2H_5COOCH(CH_3)_2$	$CH_3C{=}CH_2$?	10.40 ± 0.1	SL	66	1413
$C_3H_7O_2^+$	$(CH_3O)_3CH$	CH_3O	10.36 ± 0.06	RPD	118	1139

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_8O_2^+$				
$C_3H_8O_2^+$	$(CH_3O)_2CH_2$		10.00 ± 0.05	PI	145*	0182
		$CH_3COOCH{=}CH_2^+$ Heat of formation 137 kcal mol^{-1}				
		$CH_3COCOCH_3^+$ 135 kcal mol^{-1}				
$C_4H_6O_2^+$	$CH_3COOCH{=}CH_2$		9.19 ± 0.05	PI	137*	182
$C_4H_6O_2^+$	$CH_3COCOCH_3$		9.23 ± 0.03	PI	135*	182
$C_4H_6O_2^+$	$CH_3COCOCH_3$		9.25 ± 0.03	PI	135*	416
$C_4H_6O_2^+$	$CH_3COCOCH_3$		9.60 ± 0.02	EVD	143	128
$C_4H_6O_2^+$	$CH_3COCOCH_3$		10.22 ± 0.18	EVD		128
		***n*-$C_3H_7COOH^+$ Heat of formation 121 kcal mol^{-1}**				
		***iso*-$C_3H_7COOH^+$ 113 kcal mol^{-1}**				
		$HCOOC_3H_7^+$ 149 kcal mol^{-1}				
		$CH_3COOC_2H_5^+$ 126 kcal mol^{-1}				
		$C_2H_5COOCH_3^+$ 127 kcal mol^{-1}				
		$C_4H_8O_2^+$(*p*-Dioxane) 126 kcal mol^{-1}				
$C_4H_8O_2^+$	*n*-C_3H_7COOH		10.16 ± 0.05	PI	121*	182
$C_4H_8O_2^+$	*iso*-C_3H_7COOH		10.02 ± 0.05	PI	113*	182
$C_4H_8O_2^+$	$HCOOCH_2CH_2CH_3$		10.54 ± 0.01	PI	149*	182
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.09 ± 0.02	PI	126*	416
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.11 ± 0.02	PI	127*	182
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.64	RPD		2018
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		11.1	RPD		2018
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		11.6	RPD		2018
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.13 ± 0.02	VC	127	305
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.32 ± 0.1	VC	131	1059
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.2 ± 0.1	VC	129	1100
$C_4H_8O_2^+$	$CH_3COOC_2H_5$		10.40 ± 0.05	CS	133	2025
$C_4H_8O_2^+$	$C_2H_5COOCH_3$		10.15 ± 0.03	PI	127*	182
$C_4H_8O_2^+$ (*p*-Dioxane)	$C_4H_8O_2$		9.13 ± 0.03	PI	126*	182
$C_4H_8O_2^+$ (*p*-Dioxane)	$C_4H_8O_2$		9.8	EC	141	218
		$C_4H_9O_2^+$				
$C_4H_9O_2^+$	$(CH_3O)_3CCH_3$	CH_3O	10.37 ± 0.02	RPD	112	1139
		$C_4H_{10}O^+_2$				
$C_4H_{10}O_2^+$	$(CH_3O)_2CHCH_3$		9.65 ± 0.03	PI	129*	182
		$C_5H_4O_2^+$				
$C_5H_4O_2^+$ (2-Furaldehyde)	C_4H_3OCHO		9.21 ± 0.01	PI	187*	182
$C_5H_4O_2^+$ (2-Furaldehyde)	C_4H_3OCHO		9.31 ± 0.09	SL	190	411

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_8O_2^+$				
$C_5H_8O_2^+$	$CH_3COCH_2COCH_3$		8.87 ± 0.03	PI	122*	182
		$C_5H_{10}O_2^+$				
$C_5H_{10}O_2^+$	$HCOO(CH_2)_3CH_3$		10.50 ± 0.02	PI	144*	182
$C_5H_{10}O_2^+$	$HCOOCH_2CH(CH_3)_2$		10.46 ± 0.02	PI	139*	182
$C_5H_{10}O_2^+$	$CH_3COOCH_2CH_2CH_3$		10.04 ± 0.03	PI	119*	182
$C_5H_{10}O_2^+$	$CH_3COOCH(CH_3)_2$		9.99 ± 0.03	PI	115*	182
$C_5H_{10}O_2^+$	$C_2H_5COOC_2H_5$		10.00 ± 0.02	PI	117*	182
$C_5H_{10}O_2^+$	$C_2H_5COOC_2H_5$		10.2 ± 0.1	VC	122	1100
$C_5H_{10}O_2^+$	n-$C_3H_7COOCH_3$		10.07 ± 0.03	PI	122*	182
$C_5H_{10}O_2^+$	iso-$C_3H_7COOCH_3$		9.98 ± 0.02	PI	118*	182
		$C_5H_{12}O_2^+$				
$C_5H_{12}O_2^+$	$(C_2H_5O)_2CH_2$		9.70 ± 0.05	PI	134*	182
		$C_6H_4O_2^+$				
$C_6H_4O_2^+$ (p-Benzoquinone)	$C_6H_4O_2$		9.67 ± 0.02	PI	198*	1166
		$C_6H_6O_2^+$				
$C_6H_6O_2^+$ (Dihydroxybenzene)	$C_6H_4(OH)_2$		8.85	TC	133	2194
		$C_6H_{12}O_2^+$				
$C_6H_{12}O_2^+$	$CH_3COOC_4H_9$		9.56 ± 0.03	PI	102*	1166
$C_6H_{12}O_2^+$	$CH_3COO(CH_2)_3CH_3$		10.01?	PI	112*	182
$C_6H_{12}O_2^+$	$CH_3COOCH_2CH(CH_3)_2$		9.97?	PI	109*	182
$C_6H_{12}O_2^+$	$CH_3COOCH(CH_3)C_2H_5$		9.91 ± 0.03	PI	108*	182
		$C_7H_6O_2^+$(Benzoic acid) Heat of formation 152 kcal mol^{-1}				
		$C_7H_6O_2^+$(p-Hydroxybenzaldehyde) 157 kcal mol^{-1}				
$C_7H_6O_2^+$ (Benzoic acid)	C_6H_5COOH		9.73 ± 0.09	CS	152*	2026
$C_7H_6O_2^+$ (p-Hydroxybenzaldehyde)	C_6H_4OHCHO		9.32 ± 0.02	CS	157*	2026
$C_7H_6O_2^+$ (Hydroxybenzaldehyde)	C_6H_4OHCHO		9.29	TC	156	2194
$C_7H_6O_2^+$ (Tropolone)	$C_7H_6O_2$		9.86 ± 0.02	CS		431
$C_7H_6O_2^+$ (Tropolone)	$C_7H_6O_2$		9.83 ± 0.02	LE		431
		$C_7H_8O_2^+$				
$C_7H_8O_2^+$ (Methoxyphenol)	$C_6H_4OHOCH_3$		8.58	TC	137	2194

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_8O_2^+$				
$C_8H_8O_2^+$ (α-Hydroxyacetophenone)	$C_6H_5COCH_2OH$		9.33 ± 0.05	CS	159*	2025
$C_8H_8O_2^+$ (Methyl benzoate)	$C_6H_5COOCH_3$		10.0	SL	159	308
$C_8H_8O_2^+$ (Methyl benzoate)	$C_6H_5COOCH_3$		9.35 ± 0.06	CS	144*	2026
$C_8H_8O_2^+$ (p-Methoxybenzaldehyde)	$C_6H_4OCH_3CHO$		8.60 ± 0.03	CS	150*	2026
$C_8H_8O_2^+$ (Methoxybenzaldehyde)	$C_6H_4OCH_3CHO$		8.91	TC	157	2194
$C_8H_8O_2^+$ (m-Hydroxyacetophenone)	$C_6H_4OHCOCH_3$		8.67 ± 0.05	CS	134*	2025
$C_8H_8O_2^+$ (p-Hydroxyacetophenone)	$C_6H_4OHCOCH_3$		8.70 ± 0.03	CS	135*	2026
$C_8H_8O_2^+$ (Hydroxyacetophenone)	$C_6H_4OHCOCH_3$		9.01	TC	142	2194
		$C_9H_{10}O_2^+$				
$C_9H_{10}O_2^+$ (α-Methoxyacetophenone)	$C_6H_5COCH_2OCH_3$		8.60 ± 0.05	CS	142*	2025
$C_9H_{10}O_2^+$ (m-Methoxyacetophenone)	$C_6H_4OCH_3COCH_3$		8.53 ± 0.05	CS	140*	2025
$C_9H_{10}O_2^+$ (p-Methoxyacetophenone)	$C_6H_4OCH_3COCH_3$		8.62 ± 0.05	CS	142*	2026
$C_9H_{10}O_2^+$ (Methoxyacetophenone)	$C_6H_4OCH_3COCH_3$		8.72	TC	144	2194
$C_9H_{10}O_2^+$ (Methyl p-toluate)	$C_6H_4CH_3COOCH_3$		8.94 ± 0.04	CS	130*	2026
$C_9H_{10}O_2^+$ (Methyl toluate)	$C_6H_4CH_3COOCH_3$		9.04	TC	132	2194
		$C_{13}H_{10}O_2^+$				
$C_{13}H_{10}O_2^+$ (p-Hydroxybenzophenone)	$C_6H_4OHCOC_6H_5$		8.59 ± 0.05	CS	165*	2026
$C_{13}H_{10}O_2^+$ (Hydroxybenzophenone)	$C_6H_4OHCOC_6H_5$		9.07	TC	176	2194
$C_{13}H_{10}O_2^+$ (Phenyl benzoate)	$(C_6H_5)_2CO_2$		8.98 ± 0.05	SL	177*	1237
		$C_{14}H_{10}O_2^+$				
$C_{14}H_{10}O_2^+$ (Benzil)	$(C_6H_5)_2C_2O_2$		8.78 ± 0.05	SL	181*	1237
		$C_{14}H_{12}O_2^+$				
$C_{14}H_{12}O_2^+$ (Methoxybenzophenone)	$C_6H_4OCH_3COC_6H_5$		8.77	TC	178	2194
		$C_4H_8O_3^+$				
$C_4H_8O_3^+$	$CH_3OCH_2COOCH_3$		9.56 ± 0.05	CS	88*	2025

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_9O_3^+$				
$C_4H_9O_3^+$	$(CH_3O)_3CH$	H	10.39 ± 0.05	RPD	66	1139
$C_4H_9O_3^+$	$(CH_3O)_3CCH_3$	CH_3	10.39 ± 0.10	RPD	78	1139
$C_4H_9O_3^+$	$(CH_3O)_4C$	CH_3O	10.32 ± 0.10	RPD	80	1139
		$C_8H_8O_3^+$				
$C_8H_8O_3^+$ (Methyl hydroxybenzoate)	$C_6H_4OHCOOCH_3$		9.03	TC	94	2194
		$C_9H_{10}O_3^+$				
$C_9H_{10}O_3^+$ (Methyl *p*-methoxybenzoate)	$C_6H_4OCH_3COOCH_3$		8.43 ± 0.04	CS	90*	2026
$C_9H_{10}O_3^+$ (Methyl methoxybenzoate)	$C_6H_4OCH_3COOCH_3$		8.73	TC	97	2194
		$C_{13}H_{10}O_3^+$				
$C_{13}H_{10}O_3^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$		9.01 ± 0.05	SL	122*	1237
		$C_6H_{11}O_5^+$				
$C_6H_{11}O_5^+$ (α-Methyl-(D)-glucoside)	$C_7H_{14}O_6$	CH_3O	12.9 ± 0.16	EVD	28	2036
$C_6H_{11}O_5^+$ (β-Methyl-(D)-glucoside)	$C_7H_{14}O_6$	CH_3O	13.5 ± 0.16	EVD	42	2036
		HNO_3^+				
HNO_3^+	HNO_3		11.03 ± 0.01	PI	222	1253
		$C_2H_6BO^+$				
$C_2H_6BO^+$	$(CH_3O)_3B$	$CH_2O + OH$	16.6 ± 0.3	EVD	187	115
		$C_2H_5BO_2^+$				
$C_2H_5BO_2^+$	$(CH_3O)_3B$	$CH_2O + H_2$	13.2 ± 0.2	EVD	117	115
		$C_2H_6BO_2^+$				
$C_2H_6BO_2^+$	$(CH_3O)_2BH$	H	9.0 ± 0.2	SL	16	364
$C_2H_6BO_2^+$	$(CH_3O)_3B$	CH_3O	13.0 ± 0.2	EVD	85	115
$C_2H_6BO_2^+$	$(CH_3O)_3B$	CH_3O	9.6 ± 0.2	SL	7	364
		$C_2H_7BO_2^+$				
$C_2H_7BO_2^+$	$(CH_3O)_2BH$		9.7 ± 1.0	SL	84	364
		$C_2H_6BO_3^+$				
$C_2H_6BO_3^+$	$(CH_3O)_3B$	CH_3	12.1 ± 0.2	EVD	31	115

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_9BO_3^+$				
$C_3H_9BO_3^+$	$(CH_3O)_3B$		10.8 ± 0.3	EVD	34	115
$C_3H_9BO_3^+$	$(CH_3O)_3B$		8.9 ± 0.2	SL	-10	364
		CH_3NO^+				
CH_3NO^+	$HCONH_2$		10.25 ± 0.02	PI	190*	182
		$C_2H_5NO^+$				
$C_2H_5NO^+$	CH_3CONH_2		9.77 ± 0.02	PI	171*	182
$C_2H_5NO^+$	CH_3CONH_2		10.39 ± 0.05	CS	186	384
		$C_3H_7NO^+$				
$C_3H_7NO^+$	$HCON(CH_3)_2$		9.12 ± 0.02	PI	160*	182
$C_3H_7NO^+$	$CH_3CONHCH_3$		8.90 ± 0.02	PI	150*	182
		$C_4H_9NO^+$				
$C_4H_9NO^+$	$CH_3CON(CH_3)_2$		8.81 ± 0.03	PI	145*	182
		$C_5H_5NO^+$				
$C_5H_5NO^+$ (4-Hydroxypyridine)	C_5H_4NOH		9.70 ± 0.05	SL	209*	217
		$C_5H_{11}NO^+$				
$C_5H_{11}NO^+$	$HCON(C_2H_5)_2$		8.89 ± 0.02	PI	145*	182
		$C_6H_5NO^+$				
$C_6H_5NO^+$ (2-Pyridinecarboxaldehyde)	C_5H_4NCHO		9.75 ± 0.05	SL	227*	217
$C_6H_5NO^+$ (4-Pyridinecarboxaldehyde)	C_5H_4NCHO		10.12 ± 0.05	SL	235*	217
		$C_6H_7NO^+$				
$C_6H_7NO^+$ (Aminophenol)	$C_6H_4OHNH_2$		8.13	TC	166	2194
		$C_6H_{13}NO^+$				
$C_6H_{13}NO^+$	$CH_3CON(C_2H_5)_2$		8.60 ± 0.02	PI	130*	182
		***cyclo*-$C_6H_5NCO^+$ Heat of formation 222 kcal mol^{-1}**				
$C_7H_5NO^+$ (Phenyl isocyanate)	C_6H_5NCO		8.77 ± 0.02	PI	222*	182
$C_7H_5NO^+$ (Cyanophenol)	C_6H_4OHCN		9.60	TC	227	2194
$C_7H_5NO^+$ (3,5-Diphenyl-1,2,4-oxadiazole)	$(C_6H_5)_2C_2N_2O$		10.8 ± 0.1	SL		1125

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_7H_7NO^+$(Benzamide) Heat of formation 197 kcal mol^{-1}						
$C_7H_7NO^+$(*p*-Aminobenzaldehyde) 182 kcal mol^{-1}						
$C_7H_7NO^+$ (Benzamide)	$C_6H_5CONH_2$		9.4 ± 0.2	SL	195*	1168
$C_7H_7NO^+$ (Benzamide)	$C_6H_5CONH_2$		9.64	SL	200*	1126
$C_7H_7NO^+$ (*p*-Aminobenzaldehyde)	$C_6H_4CHONH_2$		8.25 ± 0.02	CS	182*	2026
$C_7H_7NO^+$ (Aminobenzaldehyde)	$C_6H_4CHONH_2$		8.38	TC	185	2194
$C_7H_7NO^+$ (2-Aminotropone)	C_7H_7NO		9.43 ± 0.02	CS		431
C_7H_7NO (2-Aminotropone)	C_7H_7NO		9.50 ± 0.02	LE		431
$C_7H_9NO^+$						
$C_7H_9NO^+$ (*p*-Methoxyaniline)	$C_6H_4NH_2OCH_3$		7.82	SL	169*	1066
$C_8H_5NO^+$						
$C_8H_5NO^+$ (Cyanobenzaldehyde)	C_6H_4CHOCN		10.38	TC	221	2194
$C_8H_9NO^+$						
$C_8H_9NO^+$ (Acetanilide)	$C_6H_5NHCOCH_3$		8.39 ± 0.10	SL	171*	1126
$C_8H_9NO^+$ (*m*-Aminoacetophenone)	$C_6H_4COCH_3NH_2$		8.09 ± 0.05	CS	171*	2025
$C_8H_9NO^+$ (*p*-Aminoacetophenone)	$C_6H_4COCH_3NH_2$		8.17 ± 0.02	CS	172*	2026
$C_8H_9NO^+$ (Aminoacetophenone)	$C_6H_4COCH_3NH_2$		8.25	TC	174	2194
$C_9H_7NO^+$						
$C_9H_7NO^+$ (α-Cyanoacetophenone)	$C_6H_5COCH_2CN$		9.56 ± 0.05	CS	235*	2025
$C_9H_7NO^+$ (Cyanoacetophenone)	$C_6H_4COCH_3CN$		9.95	TC	240	2194
$C_{13}H_{11}NO^+$						
$C_{13}H_{11}NO^+$ (Aminobenzophenone)	$C_6H_4NH_2COC_6H_5$		8.30	TC	208	2194
$C_{14}H_9NO^+$						
$C_{14}H_9NO^+$ (Cyanobenzophenone)	$C_6H_4CNCOC_6H_5$		9.81	TC	269	2194
$C_2HN_2O^+$						
$C_2HN_2O^+$	CH_3COCHN_2	CH_3	11.42 ± 0.08	VC		2174
$C_2HN_2O^+$	$CH_2ClCOCHN_2$	CH_2Cl	10.95 ± 0.15	VC		2174
$C_2HN_2O^+$	CCl_3COCHN_2	CCl_3	10.12 ± 0.08	VC		2174

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_4N_2O^+$				
$C_3H_4N_2O^+$	CH_3COCHN_2		9.40 ± 0.03	VC		2174
		$C_8H_5N_2O^+$				
$C_8H_5N_2O^+$	$C_6H_5C_2N_2OC_3F_7$ (2-Phenyl-5-perfluoropropyl-1,3,4-oxadiazole)		11.8 ± 0.2	SL		2156
$C_8H_5N_2O^+$	$C_6H_5C_2N_2OC_7F_{15}$ (2-Phenyl-5-perfluoroheptyl-1,3,4-oxadiazole)		12.1 ± 0.1	SL		2156
		$C_8H_6N_2O^+$				
$C_8H_6N_2O^+$ (Diazoacetophenone)	$C_6H_5COCHN_2$		9.22 ± 0.04	VC		2174
		$C_{14}H_{10}N_2O^+$				
$C_{14}H_{10}N_2O^+$ (3,5-Diphenyl-1,2,4-oxadiazole)	$(C_6H_5)_2C_2N_2O$		9.2 ± 0.1	SL		1125
$C_{14}H_{10}N_2O^+$ (2,5-Diphenyl-1,3,4-oxadiazole)	$(C_6H_5)_2C_2N_2O$		8.9 ± 0.3	SL		1125
		$CH_2NO_2^+$				
$CH_2NO_2^+$	CH_3NO_2	H	11.97 ± 0.02	VC	206*	90
		$CH_3NO_2^+$ Heat of formation 238 kcal mol^{-1}				
$CH_3NO_2^+$	CH_3NO_2		11.08 ± 0.03	PI	238*	182
$CH_3NO_2^+$	CH_3NO_2		11.130 ± 0.006	PI	239*	1253
$CH_3NO_2^+$	CH_3NO_2		11.4	RPD		2018
$CH_3NO_2^+$	CH_3NO_2		11.9	RPD		2018
$CH_3NO_2^+$	CH_3NO_2		12.8	RPD		2018
$CH_3NO_2^+$	CH_3NO_2		11.34 ± 0.09	VC	244	90
		$C_2H_5NO_2^+$ Heat of formation 227 kcal mol^{-1}				
$C_2H_5NO_2^+$	$C_2H_5NO_2$		10.88 ± 0.05	PI	227*	182
$C_2H_5NO_2^+$	$C_2H_5NO_2$		11.2	RPD		2018
$C_2H_5NO_2^+$	$C_2H_5NO_2$		11.6	RPD		2018
$C_2H_5NO_2^+$	$C_2H_5NO_2$		12.0	RPD		2018
$C_2H_5NO_2^+$	$C_2H_5NO_2$		12.6	RPD		2018
$C_2H_5NO_2^+$	$C_2H_5NO_2$		13.1	RPD		2018
$C_2H_5NO_2^+$	NH_2CH_2COOH		9.5 ± 0.2	LE	122	88
		***n*-$C_3H_7NO_2^+$ Heat of formation 221 kcal mol^{-1}** ***iso*-$C_3H_7NO_2^+$ 217 kcal mol^{-1}**				
$C_3H_7NO_2^+$	*n*-$C_3H_7NO_2$		10.81 ± 0.03	PI	221*	182
$C_3H_7NO_2^+$	*n*-$C_3H_7NO_2$		11.1	RPD		2018
$C_3H_7NO_2^+$	*n*-$C_3H_7NO_2$		11.4	RPD		2018
$C_3H_7NO_2^+$	*n*-$C_3H_7NO_2$		11.8	RPD		2018
$C_3H_7NO_2^+$	*n*-$C_3H_7NO_2$		12.6	RPD		2018
$C_3H_7NO_2^+$	*iso*-$C_3H_7NO_2$		10.71 ± 0.05	PI	217*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_5NO_2^+$				
$C_4H_5NO_2^+$	$CH_2CNCOOCH_3$		10.87 ± 0.05	CS	185	2025
		$C_6H_5NO_2^+$				
$C_6H_5NO_2^+$ (Nitrobenzene)	$C_6H_5NO_2$		9.92	PI	244*	182
$C_6H_5NO_2^+$ (Nitrobenzene)	$C_6H_5NO_2$		10.18	SL	250	1066
		$C_6H_{13}NO_2^+$				
$C_6H_{13}NO_2^+$ (Isoleucine)	$C_2H_5CH(CH_3)CH(NH_2)COOH$		9.5 ± 0.2	LE	99	88
		$C_7H_6NO_2^+$				
$C_7H_6NO_2^+$ (*m*-Nitrobenzyl radical)	$C_6H_4NO_2CH_2$		8.56 ± 0.1	SL	227*	69
		$C_7H_7NO_2^+$				
$C_7H_7NO_2^+$ (*m*-Nitrotoluene)	$C_6H_4CH_3NO_2$		9.65 ± 0.05	CS	233*	2025
$C_7H_7NO_2^+$ (*p*-Nitrotoluene)	$C_6H_4CH_3NO_2$		9.82	SL	237*	1066
$C_7H_7NO_2^+$ (Nitrotoluene)	$C_6H_4CH_3NO_2$		9.70	TC	234	2194
		$C_8H_9NO_2^+$				
$C_8H_9NO_2^+$ (Methyl *p*-aminobenzoate)	$C_6H_4NH_2COOCH_3$		8.08 ± 0.01	CS	122*	2026
$C_8H_9NO_2^+$ (Methyl aminobenzoate)	$C_6H_4NH_2COOCH_3$		8.25	TC	126	2194
		$C_9H_7NO_2^+$				
$C_9H_7NO_2^+$ (Methyl cyanobenzoate)	$C_6H_4CNCOOCH_3$		10.06	TC	195	2194
		$C_6H_6N_2O_2^+$				
$C_6H_6N_2O_2^+$ (*o*-Nitroaniline)	$C_6H_4NH_2NO_2$		8.66	SL	215*	1066
$C_6H_6N_2O_2^+$ (*m*-Nitroaniline)	$C_6H_4NH_2NO_2$		8.80	SL	218*	1066
$C_6H_6N_2O_2^+$ (*p*-Nitroaniline)	$C_6H_4NH_2NO_2$		8.85	SL	219*	1066
		$CH_2NO_3^+$				
$CH_2NO_3^+$	$C_2H_5ONO_2$	CH_3	10.13 ± 0.11	VC	164	1013
		$C_2H_5NO_3^+$				
$C_2H_5NO_3^+$	$C_2H_5ONO_2$		11.22	PI	222*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_7NO_3^+$				
$C_3H_7NO_3^+$	n-$C_3H_7ONO_2$		11.07 ± 0.02	PI	213*	182
		$C_6H_5NO_3^+$				
$C_6H_5NO_3^+$ (p-Nitrophenol)	$C_6H_4OHNO_2$		9.52	SL	187*	1066
$C_6H_5NO_3^+$ (Nitrophenol)	$C_6H_4OHNO_2$		9.67	TC	191	2194
		$C_7H_5NO_3^+$				
$C_7H_5NO_3^+$ (p-Nitrobenzaldehyde)	$C_6H_4CHONO_2$		10.27 ± 0.01	CS	217*	2026
$C_7H_5NO_3^+$ (Nitrobenzaldehyde)	$C_6H_4CHONO_2$		10.40	TC	220	2194
		$C_8H_7NO_3^+$				
$C_8H_7NO_3^+$ (m-Nitroacetophenone)	$C_6H_4NO_2COCH_3$		9.89 ± 0.05	CS	201*	2025
$C_8H_7NO_3^+$ (p-Nitroacetophenone)	$C_6H_4NO_2COCH_3$		10.07 ± 0.02	CS	205*	2026
$C_8H_7NO_3^+$ (Nitroacetophenone)	$C_6H_4NO_2COCH_3$		10.10	TC	206	2194
		$C_{13}H_9NO_3^+$				
$C_{13}H_9NO_3^+$ (Nitrobenzophenone)	$C_6H_4NO_2COC_6H_5$		10.57	TC	249	2194
		$C_8H_7NO_4^+$				
$C_8H_7NO_4^+$ (Methyl p-Nitrobenzoate)	$C_6H_4NO_2COOCH_3$		10.20 ± 0.03	CS	160*	2026
$C_8H_7NO_4^+$ (Methyl nitrobenzoate)	$C_6H_4NO_2COOCH_3$		10.20	TC	160	2194
		F^+ Heat of formation 421 kcal mol^{-1}				
F^+	F		17.426	S	421*	2113
F^+	BF_3		31.5 ± 2	EVD		440
F^+	CF_4		36 ± 1	SL		24
F^+	CF_4	CF_3	24.0 ± 1.0	NS	447	2157
F^+	C_2F_6		22.6	LE		1062
F^+ (Hexafluorobenzene)	C_6F_6	C_6F_5	29.2 ± 0.5	SL		1132
F^+	C_3F_8		23.5	LE		1062
F^+ (Perfluorocylobutane)	C_4F_8		24.0	LE		1062
F^+	NF_3	N + F + F$^-$?	25 ± 1	SL	480	401
F^+	CF_3Cl		31 ± 1	SL		24
F^+	ClO_3F		27 ± 3	SL		53
F^+	F		17.4 ± 0.3	VC	420	2165
F^+	CF_3Br		29 ± 1	SL		24
F^+	CF_3I		33 ± 1	SL		24

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		F_2^+				
F_2^+	F_2		15.7	S	362*	355
F_2^+	F_2		15.83 ± 0.05	SL	365	75
		HF^+				
$HF^+(^2\Pi)$	HF		15.77 ± 0.02	RPD	299*	463
$HF^+(^2\Sigma)$	HF		16.91 ± 0.10	RPD	325	463
		XeF^+				
XeF^+	XeF_2	F	13.3 ± 0.1	LE	262	2053
XeF^+	XeF_4	$F_2 + F$	13.3 ± 0.1	LE	236	2053
		XeF_2^+				
XeF_2^+	XeF_2		11.5 ± 0.2	S	239	2181
XeF_2^+	XeF_2		12.6 ± 0.1	LE	265	2053
XeF_2^+	XeF_4	2F	14.9 ± 0.1	LE	254	2053
		XeF_3^+				
XeF_3^+	XeF_4	F	13.1 ± 0.1	LE	232	2053
		XeF_4^+				
XeF_4^+	XeF_4		12.9 ± 0.1	LE	246	2053
XeF_4^+	XeF_4		13.2	TC	253	2168
XeF_4^+	XeF_4		13.8	TC	267	1164
		LiF^+				
LiF^+	LiF		11.3	VC	181	2179
		Li_2F^+				
Li_2F^+	Li_2F_2	F	11.5	VC	25	2179
		BeF^+				
BeF^+	BeF		9.1 ± 0.5	VC	168	2141
BeF^+	BeF_2	F	15.4 ± 0.4	VC	147	2142
BeF^+	BeF_2	F	15.5	VC	149	2141
		BeF_2^+				
BeF_2^+	BeF_2		14.5 ± 0.4	VC	145	2142
BeF_2^+	BeF_2		14.7 ± 0.4	VC	149	2141
		BF^+ Heat of formation 233 kcal mol^{-1}				
BF^+	BF		11.5 ± 0.4	VC	236*	1297
BF^+	BF		10.93	TC	223	1268
BF^+	BF		11.2 ± 0.4	LE	229*	440
BF^+	BF_3	2F?	25.2 ± 0.2	EVD	272	440

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
BF_2^+ Heat of formation 87 kcal mol^{-1}						
BF_2^+	BF_3	F	16.2 ± 0.2	SL	83*	364
BF_2^+	BF_3	F	16.17 ± 0.05	EVD	82*	440
BF_2^+	BF_3	F	16.5 ± 0.8	VC	90*	1297
BF_2^+	BF_3	F	16.25 ± 0.2	LE	84*	362
BF_2^+	BF_3	F	16.7 ± 0.4	VC	95*	2040
BF_2^+	CH_3BF_2	CH_3	13.62 ± 0.02	SL	(a)	1076
BF_2^+	$CH_2{=}CHBF_2$	C_2H_3	14.8 ± 0.1	SL	86	1076
BF_2^+	$C_2H_5BF_2$	C_2H_5	14.3 ± 0.2	SL	91	1076
BF_2^+	*iso*-$C_3H_7BF_2$	*iso*-C_3H_7	14.6 ± 0.2	SL	101	1076
BF_3^+ Heat of formation 87 kcal mol^{-1}						
BF_3^+	BF_3		15.5 ± 0.5	SL	86*	364
BF_3^+	BF_3		16.4 ± 0.4	VC	106	2040
BF_3^+	BF_3		15.5 ± 0.3	LE	86*	362
BF_3^+	BF_3		15.7 ± 0.1	LE	90*	440
CF^+						
CF^+	CF		13.81 ± 0.12	LE	386	129
CF^+	CF_4	$F_2 + F^-$?	22.6 ± 0.5	SL	365	24
CF^+	CF_4	$F_2 + F^-$?	22.85 ± 0.2	NS	371	2157
CF^+	CF_4	$F + F_2$?	27.32 ± 0.07	LE	390	129
CF^+	C_2F_4		14.06	VC		419
CF^+	C_3F_6	$C_2F_4 + F$?	18.1	VC	295	1290
CF^+	C_3F_6 (Hexafluorocyclopropane)		17.3	VC		1290
CF^+	C_6F_6 (Hexafluorobenzene)		17.3 ± 0.3	SL		1132
CF^+	$C_6F_{11}CF_3$ (Perfluoromethylcyclohexane)		15.93	EVD		2192
CF^+	C_2H_3F		15.43	VC		419
CF^+	CH_2F_2	HF + H?	18.8	VC	339	1288
CF^+	$CH_2{=}CF_2$		15.23	VC		419
CF^+	CHF_3	HF + F?	20.2 ± 0.4	EVD	347	43
CF^+	CHF_3	HF + F?	20.75	VC	360	1288
CF^+	C_2HF_3		15.2	VC		419
CF^+	CF_3Cl		22.6 ± 0.5	SL		24
CF^+	$CF_2ClCF{=}CF_2$		17.8	VC		1290
CF^+	CHF_2Cl	HF + Cl?	17.30 ± 0.15	EVD	322	43
CF^+	$CHFCl_2$	HCl + Cl?	16.9 ± 0.2	EVD	314	43
CF^+	CF_3Br		22.9 ± 0.5	SL		24
CF^+	CF_3I		19.9 ± 0.3	EVD		439
CF^+	CF_3I		20.7 ± 1	SL		24
C_3F^+						
C_3F^+	C_6F_6 (Hexafluorobenzene)		22 ± 1	SL		1132
C_3F^+	C_6F_6 (Hexafluorobenzene)		25.9 ± 1	SL		1132
C_5F^+						
C_5F^+	C_6F_6 (Hexafluorobenzene)		29.0 ± 0.5	SL		1132

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CF_2^+ Heat of formation 237 kcal mol^{-1}						
CF_2^+	CF_2		11.7 ± 0.1	SL	235*	2164
CF_2^+	CF_2		11.86 ± 0.1	SL	239*	1252
CF_2^+	CF_2		13.30 ± 0.12	LE	272	129
CF_2^+	CF_4	F_2	20.3 ± 0.5	SL	247	24
CF_2^+	CF_4	2F	22.2	VC	253	1288
CF_2^+	CF_4	2F	22.33 ± 0.06	LE	256	129
CF_2^+	CF_4	2F	22.45 ± 0.2	NS	259	2157
CF_2^+	C_2F_4	CF_2	15.2 ± 0.3	SL	230	214
CF_2^+	C_2F_4	CF_2	15.26 ± 0.05	SL	231	1252
CF_2^+	C_2F_4	CF_2	15.13	VC	228	419
CF_2^+	C_3F_6	$CF + CF_3$?	19.8	VC	244	1290
CF_2^+ (Hexafluorocyclopropane)	C_3F_6	C_2F_4?	17.4	VC		1290
CF_2^+ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$		13.93	EVD		2192
CF_2^+	CH_2F_2		14.8 ± 0.4	LE		2160
CF_2^+	CH_2F_2		20.7	VC		1288
CF_2^+	CHF_3		14.7 ± 0.4	LE		2160
CF_2^+	CHF_3		20.2	VC		1288
CF_2^+	C_2HF_3	CHF?	19.28	VC		419
CF_2^+	CHF_2Cl	$H + Cl^-$?	16.1 ± 0.3	EVD	265	43
CF_2^+	CHF_3	$H + F^-$?	17.5 ± 0.3	EVD	252	43
CF_2^+	CF_3Cl	F + Cl	20 ± 1	SL	247	24
CF_2^+	CF_3Br	F + Br	18.3 ± 0.1	EVD	223	439
CF_2^+	CF_3Br	F + Br?	21.4 ± 0.2	EVD		439
CF_2^+	CF_3Br	F + Br	19.5 ± 0.5	SL	250	24
CF_2^+	CF_3I	F + I	17.95 ± 0.1	EVD	229	439
CF_2^+	CF_3I	F + I	18.5 ± 0.6	SL	241	24
CF_2^{+2}						
CF_2^{+2}	CF_4	2F	44.3 ± 0.3	NS	763	2157
$C_2F_2^+$						
$C_2F_2^+$	C_2HF_3	HF	14.83	VC	295	419
$C_3F_2^+$						
$C_3F_2^+$ (Hexafluorobenzene)	C_6F_6		18.9 ± 0.5	SL		1132
$C_4F_2^+$						
$C_4F_2^+$ (Hexafluorobenzene)	C_6F_6		18 ± 1	SL		1132
$C_4F_2^+$ (Hexafluorobenzene)	C_6F_6		20.2 ± 1	SL		1132
$C_5F_2^+$						
$C_5F_2^+$ (Hexafluorobenzene)	C_6F_6		22 ± 1	SL		1132
$C_5F_2^+$ (Hexafluorobenzene)	C_6F_6		24.3 ± 1	SL		1132

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CF_3^+				
CF_3^+	CF_3		10.10 ± 0.05	EVD	119	441
CF_3^+	CF_3		10.2	SL	121	141
CF_3^+	CF_3		10.15 ± 0.06	LE	120	129
CF_3^+	CF_4	F	15.56 ± 0.01	PI	119	1235
CF_3^+	CF_4	F	16.0 ± 0.2	SL	129	24
CF_3^+	CF_4	F	16.2	VC	134	1288
CF_3^+	CF_4	F	15.40 ± 0.05	LE	115	129
CF_3^+	CF_4	F	15.9 ± 0.1	NS	127	2157
CF_3^+	C_2F_4	CF	13.54	VC	89	419
CF_3^+	C_2F_4	C + F⁻?	15.4	FDP	93	1378
CF_3^+	C_2F_4	CF	14.4	FDP	109	1378
CF_3^+	C_2F_6	CF_3	14.2	VC	132	1288
CF_3^+	C_2F_6	CF_3	14.3 ± 0.1	VC	134	1419
CF_3^+	C_2F_6		15.4	LE		1062
CF_3^+	C_3F_6	C_2F_3	15.96	VC	155	1290
CF_3^+	C_3F_6	C_2F_3	15.0 ± 0.1	LE	133	1067
CF_3^+	C_3F_6 (Hexafluorocyclopropane)	C_2F_3	15.38	VC		1290
CF_3^+	C_6F_6 (Hexafluorobenzene)		17.1	SL		1132
CF_3^+	C_6F_6 (Hexafluorobenzene)		19.8 ± 1	SL		1132
CF_3^+	C_3F_8	C_2F_5	14.4 ± 0.1	VC	133	1419
CF_3^+	C_3F_8	C_2F_5	14.65	LE	139	1062
CF_3^+	C_4F_8 (Perfluorocyclobutane)		15.7	LE		1062
CF_3^+	n-C_4F_{10}	n-C_3F_7	14.3 ± 0.1	VC	131	1419
CF_3^+	$C_6F_{11}CF_3$ (Perfluoromethylcyclohexane)		14.4	EVD		2192
CF_3^+	CHF_3	H	14.03 ± 0.06	RPD	107	1139
CF_3^+	CHF_3	H	14.53 ± 0.05	EVD	119	441
CF_3^+	CHF_3	H	14.67 ± 0.20	EVD	122	43
CF_3^+	CHF_3	H	14.42	VC	116	1288
CF_3^+	CH_3CF_3	CH_3	13.90 ± 0.03	SL	109	1075
CF_3^+	$CH_2{=}CHCF_3$	C_2H_3	15.0 ± 0.2	SL	127	1075
CF_3^+	$C_2H_5CF_3$	C_2H_5	14.8 ± 0.1	SL	125	1075
CF_3^+	CF_3Cl	Cl	13.06 ± 0.05	EVD	106	441
CF_3^+	CF_3Cl	Cl	12.7 ± 0.2	SL	98	24
CF_3^+	$CF_2ClCF{=}CF_2$	C_2F_2Cl	15.63	VC		1290
CF_3^+	CF_3Br	Br	12.1	EVD	99	441
CF_3^+	CF_3Br	Br	12.15 ± 0.02	EVD	100	439
CF_3^+	CF_3Br	Br	12.2 ± 0.2	SL	101	24
CF_3^+	CF_3Br	Br	12.51 ± 0.05	SL	108	1131
CF_3^+	CF_3I	I	11.28 ± 0.02	EVD	94	439
CF_3^+	CF_3I	I	11.4 ± 0.4	SL	96	24
CF_3^+	CF_3I	I	11.5 ± 0.1	MSD	99	1111
		CF_3^{+2}				
CF_3^{+2}	CF_4	F	42.7 ± 0.3	NS	745	2157

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2F_3^+$				
$C_2F_3^+$	C_2F_4	F	16.00	VC	195	419
$C_2F_3^+$	C_3F_6	CF_2+F?	19.32	VC	203	1290
$C_2F_3^+$	C_3F_6	CF_3	16.1 ± 0.2	LE	227	1067
$C_2F_3^+$ (Hexafluorocyclopropane)	C_3F_6		18.3	VC		1290
$C_2F_3^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$		14.1	EVD		2192
		$C_3F_3^+$				
$C_3F_3^+$ (Hexafluorobenzene)	C_6F_6		16.8 ± 0.3	SL		1132
$C_3F_3^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$		16.6	EVD		2192
		$C_5F_3^+$				
$C_5F_3^+$ (Hexafluorobenzene)	C_6F_6		15.8 ± 0.2	SL		1132
		CF_4^+				
CF_4^+	CF_4		14.36	TC	110	1164
CF_4^+	CF_4		14.9 ± 0.2	D	123	1110
		$C_2F_4^+$ Heat of formation 78 kcal mol^{-1}				
$C_2F_4^+$	C_2F_4		10.12	PI	78*	168
$C_2F_4^+$	C_2F_4		9.3 ± 0.2	SL	59	214
$C_2F_4^+$	C_2F_4		10.12	VC	78	419
$C_2F_4^+$	C_3F_6	CF_2	13.15	VC	80	1288, 1290
$C_2F_4^+$	C_3F_6	CF_2	12.5 ± 0.1	LE	65	1067
$C_2F_4^+$ (Hexafluorocyclopropane)	C_3F_6		11.85	VC		1290
$C_2F_4^+$ (Perfluorocyclobutane)	C_4F_8	C_2F_4	12.3 ± 0.1	VC	87	1290
$C_2F_4^+$ (Perfluorocyclobutane)	C_4F_8	C_2F_4	12.25	LE	86	1062
$C_2F_4^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$		12.4	EVD		2192
		$C_3F_4^+$				
$C_3F_4^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$		11.9	EVD		2192
		$C_5F_4^+$				
$C_5F_4^+$ (Hexafluorobenzene)	C_6F_6	CF_2?	16.1 ± 0.3	SL		1132

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2F_5^+$				
$C_2F_5^+$	C_2F_5		9.98±0.1	SL	18	2164
$C_2F_5^+$	C_2F_6	F	16.3±0.1	VC	47	1419
$C_2F_5^+$	C_2F_6	F	16.05	LE	41	1062
$C_2F_5^+$	C_3F_8	CF_3	15.3±0.1	VC	56	1419
$C_2F_5^+$	C_3F_8	CF_3	15.25	LE	55	1062
$C_2F_5^+$	n-C_4F_{10}	C_2F_5	14.6±0.1	VC	43	1419
$C_2F_5^+$	$C_6F_{11}CF_3$ (Perfluoromethylcyclohexane)		14.4	EVD		2192
		$C_3F_5^+$				
$C_3F_5^+$	C_3F_6	F	15.18	VC	72	1290
$C_3F_5^+$	C_3F_6	F	14.8±0.3	LE	64	1067
$C_3F_5^+$	C_3F_6 (Hexafluorocyclopropane)	F	14.14	VC		1290
$C_3F_5^+$	C_4F_8 (Perfluorocyclobutane)	CF_3	12.3±0.1	VC	46	1290
$C_3F_5^+$	C_4F_8 (Perfluorocyclobutane)	CF_3	12.25	LE	46	1062
$C_3F_5^+$	$C_6F_{11}CF_3$ (Perfluoromethylcyclohexane)		13.9	EVD		2192
$C_3F_5^+$	$CF_2ClCF{=}CF_2$	Cl	11.22	VC		1290
		$C_4F_5^+$				
$C_4F_5^+$	$C_6F_{11}CF_3$ (Perfluoromethylcyclohexane)		14.9	EVD		2192
		$C_5F_5^+$				
$C_5F_5^+$	C_6F_6 (Hexafluorobenzene)	CF	17.2±0.2	SL		1132
		$C_6F_5^+$				
$C_6F_5^+$	C_6F_6 (Hexafluorobenzene)	F	16.9±0.3	SL		1132
$C_6F_5^+$	C_6F_6 (Hexafluorobenzene)	F	16.9±0.1	SL		301
$C_6F_5^+$	$C_6F_5COCF_3$ (Perfluoroacetophenone)		16.0	SL		308
$C_6F_5^+$	$C_6F_5COCH_3$ (Pentafluoroacetophenone)		16.7	SL		308
$C_6F_5^+$	$C_6F_5CONH_2$ (Pentafluorobenzamide)		16.3±0.3	SL		1168
$C_6F_5^+$	C_6F_5Cl (Chloropentafluorobenzene)	Cl	15.9±0.1	SL		301
$C_6F_5^+$	C_6F_5Br (Bromopentafluorobenzene)	Br	15.2±0.1	SL		301

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3F_6^+$				
$C_3F_6^+$	C_3F_6		11.11	VC	−3	1290
$C_3F_6^+$	C_3F_6		10.3 ± 0.2	LE	−21	1067
$C_3F_6^+$	C_3F_6		11.1	VC	−3	1123
$C_3F_6^+$ (Hexafluorocyclopropane)	C_3F_6		11.3	VC		1290, 1123
		$C_4F_6^+$				
$C_4F_6^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	C_3F_8?	13.4	EVD	45	2192
		$C_6F_6^+$				
$C_6F_6^+$ (Hexafluorobenzene)	C_6F_6		9.97	PI		168
$C_6F_6^+$ (Hexafluorobenzene)	C_6F_6		9.93 ± 0.2	SL		1132
$C_6F_6^+$ (Hexafluorobenzene)	C_6F_6		10.0 ± 0.1	SL		301
$C_3F_6^+$ (Hexafluorobenzene)	C_6F_6		10.1 ± 0.1	SL		1127
		$C_3F_7^+$				
$C_3F_7^+$	*n*-C_3F_7		10.06 ± 0.1	SL	−75	2164
$C_3F_7^+$	*iso*-C_3F_7		10.5 ± 0.1	SL	−78	2164
$C_3F_7^+$	C_3F_8	F	17.1 ± 0.1	VC	−36	1419
$C_3F_7^+$	C_3F_8	F	16.5	LE	−50	1062
$C_3F_7^+$	*n*-C_4F_{10}	CF_3	15.0 ± 0.1	VC	−46	1419
		$C_4F_7^+$				
$C_4F_7^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	*n*-C_3F_7?	15.9	EVD	−2	2192
		$C_5F_7^+$				
$C_5F_7^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	$C_2F_5 + F_2$?	11.9	EVD	−189	2192
		$C_{11}F_7^+$				
$C_{11}F_7^+$ (Perfluorobiphenyl)	$C_{12}F_{10}$		17.2 ± 0.1	SL		1127
		$C_4F_8^+$				
$C_4F_8^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	C_3F_6	11.9	EVD	−142	2192
		$C_7F_8^+$				
$C_7F_8^+$ (Perfluorotoluene)	$C_6F_5CF_3$		10.4 ± 0.1	SL		301

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_{12}F_8^+$				
$C_{12}F_8^+$ (Perfluorobiphenyl)	$C_{12}F_{10}$	F_2?	18.4 ± 0.3	SL		1127
		$C_5F_9^+$				
$C_5F_9^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	C_2F_5	13.9	EVD	−143	2192
		$C_6F_9^+$				
$C_6F_9^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	$CF_3 + F_2$?	12.9	EVD	−264	2192
		$C_{12}F_9^+$				
$C_{12}F_9^+$ (Perfluorobiphenyl)	$C_{12}F_{10}$	F	16.7 ± 0.1	SL		1127
		$C_5F_{10}^+$				
$C_5F_{10}^+$ (Perfluorocyclopentane)	C_5F_{10}		11.7	SL		299
$C_5F_{10}^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	C_2F_4	15.9	EVD	−153	2192
		$C_6F_{10}^+$				
$C_6F_{10}^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	CF_4	12.4	EVD	−168	2192
		$C_{12}F_{10}^+$				
$C_{12}F_{10}^+$ (Perfluorobiphenyl)	$C_{12}F_{10}$		10.0 ± 0.1	SL		1127
		$C_6F_{11}^+$				
$C_6F_{11}^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	CF_3	13.9	EVD	−241	2192
		$C_{17}F_{11}^+$				
$C_{17}F_{11}^+$ (Perfluoro-*p*-terphenyl)	$C_{18}F_{14}$		18.2 ± 0.1	SL		1127
		$C_6F_{12}^+$				
$C_6F_{12}^+$ (Perfluorocyclohexane)	C_6F_{12}		13.2	SL		299
		$C_{18}F_{12}^+$				
$C_{18}F_{12}^+$ (Perfluoro-*p*-terphenyl)	$C_{18}F_{14}$		19.9	SL		1127

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7F_{13}^+$				
$C_7F_{13}^+$ (Perfluoromethylcyclohexane)	$C_6F_{11}CF_3$	F	15.4	EVD	−339	2192
		$C_{18}F_{13}^+$				
$C_{18}F_{13}^+$ (Perfluoro-*p*-terphenyl)	$C_{18}F_{14}$	F	17.5±0.3	SL		1127
		$C_7F_{14}^+$				
$C_7F_{14}^+$	*n*-$C_5F_{11}CF{=}CF_2$		10.48±0.02	PI		182
		$C_{18}F_{14}^+$				
$C_{18}F_{14}^+$ (Perfluoro-*p*-terphenyl)	$C_{18}F_{14}$		9.85±0.3	SL		1127
		$C_{24}F_{18}^+$				
$C_{24}F_{18}^+$ (Perfluoro-*p*-quaterphenyl)	$C_{24}F_{18}$		9.9±0.1	SL		1127
		NF^+ Heat of formation 349 kcal mol^{-1}				
NF^+	NF_2	F^-	11.8±0.2	SL	347*	76
NF^+	NF_2	F	15.5±0.2	SL	349*	76
NF^+	NF_2	F	15.0±0.2	VC	337	100
NF^+	*cis*-N_2F_2	NF	16.9±0.2	SL	349*	76
NF^+	*trans*-N_2F_2	NF	17.0±0.2	SL	355*	76
NF^+	NF_3	2F	17.9±0.3	SL	345*	401
		N_2F^+ Heat of formation 321 kcal mol^{-1}				
N_2F^+	*cis*-N_2F_2	F	14.0±0.2	SL	321*	76
N_2F^+	*trans*-N_2F_2	F	13.9±0.2	SL	321*	76
		NF_2^+ Heat of formation 284 kcal mol^{-1}				
NF_2^+	NF_2		12.0±0.1	SL	287*	76
NF_2^+	NF_2		11.8±0.2	VC	282*	100
NF_2^+	NF_3	F	14.2±0.3	SL	279*	401
NF_2^+	NF_3	F	14.4±0.2	SL	283*	76
NF_2^+	NF_3	F	14.6	VC	288*	100
NF_2^+	SF_5NF_2	SF_4+F?	16.3±0.2	VC	(a)	1144
NF_2^+	FSO_2NF_2	FSO_2	14.6±0.3	VC	(b)	1144
NF_2^+	FSO_2ONF_2	FSO_3	13.3±0.1	VC	(b)	1144
		$N_2F_2^+$				
$N_2F_2^+$	*trans*-N_2F_2		13.1±0.1	SL	322*	76
		NF_3^+				
NF_3^+	NF_3		13.2±0.2	SL	275*	401, 76

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$N_2F_3^+$ Heat of formation 339 kcal mol^{-1}				
$N_2F_3^+$	N_2F_4	F^-	12.0	SL	340*	76
$N_2F_3^+$	N_2F_4	F	15.6	SL	339*	76
		$N_2F_4^+$				
$N_2F_4^+$	N_2F_4		12.04 ± 0.10	SL	276*	74
		OF^+				
OF^+	OF_2	F	15.8 ± 0.2	SL	340	2047
OF^+	O_2F_2	OF	17.5 ± 0.2	RPD	367	42
(At 130 K)						
OF^+	OF_2	F	15.8 ± 0.2	RPD	340	42
(At 90 K)						
		O_2F^+				
O_2F^+	O_2F		12.6 ± 0.2	SL	294	2143
O_2F^+	O_2F_2	F	14.0 ± 0.1	RPD	308	42
(At 130 K)						
O_2F^+	O_2F_2	F	14.0 ± 0.1	SL	308	2143
		OF_2^+ Heat of formation 309 kcal mol^{-1}				
OF_2^+	OF_2		13.54 ± 0.03	RPD	307*	286
OF_2^+	OF_2		13.7 ± 0.2	SL	311*	2047
		CHF^+				
CHF^+	C_2HF_3	CF_2	15.38	VC	278	419
CHF^+	CH_2F_2	HF?	17.7	VC	366	1288
		CH_2F^+ Heat of formation 209 kcal mol^{-1}				
CH_2F^+	CH_2F		9.35	SL	209*	141
CH_2F^+	CH_2F		9.4	SL	210*	141
CH_2F^+	CH_3F	H^-?	13.25 ± 0.06	RPD	206	1139
CH_2F^+	CH_3F	H^-?	13.35	RPD	208	160
CH_2F^+	CH_3F	H	14.0	RPD	204	160
CH_2F^+	CH_3F	H^-?	15.15	RPD		160
CH_2F^+	CH_3F	H	15.85	RPD		160
CH_2F^+	CH_2F_2	F	15.28	VC	227	1288
CH_2F^+	$CH_2{=}CF_2$	CF	15.08	VC	201	419
CH_2F^+	CH_3CF_3		15.6 ± 0.2	EVD		1075
CH_2F^+	$C_2H_5CF_3$		15.7 ± 0.3	EVD		1075
		CH_3F^+				
$CH_3F^+(^2E)$	CH_3F		12.85 ± 0.01	RPD	229*	289
CH_3F^+	CH_3F		12.95 ± 0.05	RPD	232	2154
CH_3F^+	CH_3F		14.0 ± 0.05	RPD		2154
CH_3F^+	CH_3F		14.10 ± 0.03	RPD		289
CH_3F^+	CH_3F		16.89 ± 0.03	RPD		289
CH_3F^+	CH_3F		16.9 ± 0.05	RPD		2154
CH_3F^+	CH_3F		13.4 ± 0.05	RPD		2154

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_2HF^+				
C_2HF^+	C_2H_3F	H_2	14.04	VC	296	419
C_2HF^+	$CH_2{=}CF_2$	HF	14.44	VC	319	419
C_2HF^+	C_2HF_3	2F	20.0	VC	312	419
		$C_2H_2F^+$				
$C_2H_2F^+$	C_2H_3F	H	14.02	VC	243	419
$C_2H_2F^+$	$CH_2{=}CF_2$	F	14.80	VC	244	419
$C_2H_2F^+$	CH_3CF_3	HF + F?	15.8 ± 0.2	EVD	234	1075
		$C_2H_3F^+$ Heat of formation 211 kcal mol^{-1}				
$C_2H_3F^+$	C_2H_3F		10.37 ± 0.02	PI	211*	268
$C_2H_3F^+$	C_2H_3F		10.37	PI	211*	168
$C_2H_3F^+$	C_2H_3F		10.45 ± 0.05	EVD	213	268
$C_2H_3F^+$	C_2H_3F		10.45	VC	213	419
$C_2H_3F^+$	C_2H_3F		10.880	PI		268
$C_2H_3F^+$	CH_3CHF_2	HF?	14.8	VC	292	1288
$C_2H_3F^+$	$CH_2{=}CHCF_3$		13.85 ± 0.02	EVD		1075
		$C_2H_4F^+$				
$C_2H_4F^+$	CH_3CHF_2	F	14.9	VC	325	1288
		$C_3H_2F^+$				
$C_3H_2F^+$ (Fluorobenzene)	C_6H_5F		15.77 ± 0.1	SL		2103
		$C_3H_4F^+$				
$C_3H_4F^+$	$C_2H_5CF_3$		15.8 ± 0.1	EVD		1075
		$C_4H_3F^+$				
$C_4H_3F^+$ (Fluorobenzene)	C_6H_5F	C_2H_2	14.77 ± 0.1	SL	260	2103
		$C_5H_4F^+$				
$C_5H_4F^+$ (Fluorocyclopentadienyl radical)	C_5H_4F		8.82	SL		126
		$C_6H_4F^+$				
$C_6H_4F^+$ (Fluorobenzene)	C_6H_5F	H	15.22 ± 0.1	SL	272	2103
$C_6H_4F^+$ (*p*-Difluorobenzene)	$C_6H_4F_2$	F	15.5 ± 0.1	SL	268	301
$C_6H_4F^+$ (*o*-Fluorochlorobenzene)	C_6H_4FCl	Cl	13.94	EVD	261	1185
$C_6H_4F^+$ (*m*-Fluorochlorobenzene)	C_6H_4FCl	Cl	14.10	EVD	264	1185
$C_6H_4F^+$ (*p*-Fluorochlorobenzene)	C_6H_4FCl	Cl	14.13	EVD	265	1185

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$cyclo$-$C_6H_5F^+$ Heat of formation 186 kcal mol^{-1}						
$C_6H_5F^+$ (Fluorobenzene)	C_6H_5F		9.200	S	186*	344
$C_6H_5F^+$ (Fluorobenzene)	C_6H_5F		9.19 ± 0.01	PI	185*	416
$C_6H_5F^+$ (Fluorobenzene)	C_6H_5F		9.195 ± 0.01	PI	186*	182
$C_6H_5F^+$ (Fluorobenzene)	C_6H_5F		9.20	PI	186*	168
$C_6H_5F^+$ (Fluorobenzene)	C_6H_5F		9.3 ± 0.1	SL	188	301
$C_7H_6F^+$						
$C_7H_6F^+$ (m-Fluorobenzyl radical)	$C_6H_4FCH_2$		8.18 ± 0.06	SL		69
$C_7H_6F^+$ (p-Fluorobenzyl radical)	$C_6H_4FCH_2$		7.78 ± 0.1	SL		69
$C_7H_7F^+$						
$C_7H_7F^+$ (o-Fluorotoluene)	$C_6H_4FCH_3$		8.915 ± 0.01	PI	173*	182
$C_7H_7F^+$ (m-Fluorotoluene)	$C_6H_4FCH_3$		8.915 ± 0.01	PI	172*	182
$C_7H_7F^+$ (m-Fluorotoluene)	$C_6H_4FCH_3$		9.15 ± 0.05	CS	177	2025
$C_7H_7F^+$ (p-Fluorotoluene)	$C_6H_4FCH_3$		8.785 ± 0.01	PI	169*	182
CHF_2^+ Heat of formation 143 kcal mol^{-1}						
CHF_2^+	CHF_2		9.45	SL	(a)	141
CHF_2^+	CH_2F_2	H	13.14 ± 0.02	RPD	144*	1139
CHF_2^+	CH_2F_2	H	13.1	VC	143*	1288
CHF_2^+	CH_3CHF_2	CH_3	13.21	VC	157	1288
CHF_2^+	CHF_3	F	16.4 ± 0.3	EVD	195	43
CHF_2^+	CHF_3	F	15.75	VC	180	1288
CHF_2^+	C_2HF_3	CF	14.22	VC	148	419
CHF_2^+	$CH_2{=}CHCF_3$	C_2H_2F?	14.9 ± 0.1	EVD	202	1075
CHF_2^+	$C_2H_5CF_3$	C_2H_4 + F?	15.9 ± 0.1	EVD	144	1075
CHF_2^+	CHF_2Cl	Cl	12.59 ± 0.15	EVD	148	43
$CH_2F_2^+$						
$CH_2F_2^+$	CH_2F_2		12.6	VC	184	1288
$CH_2F_2^+$	CH_2F_2		12.95	TC	192	1164
$C_2HF_2^+$						
$C_2HF_2^+$	$CH_2{=}CF_2$	H	16.67	VC	254	419
$C_2HF_2^+$	C_2HF_3	F	16.13	VC	241	419

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_2F_2^+$ Heat of formation 159 kcal mol^{-1}				
$C_2H_2F_2^+$	$CH_2=CF_2$		10.30	PI	159*	168
$C_2H_2F_2^+$	$CH_2=CF_2$		10.31 ± 0.02	PI	159*	268
$C_2H_2F_2^+$	$CH_2=CF_2$		10.32 ± 0.05	EVD	159	268
$C_2H_2F_2^+$	$CH_2=CF_2$		10.45	VC	162	419
$C_2H_2F_2^+$	$CH_2=CF_2$		10.890	PI		268
$C_2H_2F_2^+$	CH_3CHF_2	2H?	16.5	VC	162	1288
$C_2H_2F_2^+$	CH_3CF_3	HF	11.2 ± 0.1	EVD	147	1075
		$C_2H_3F_2^+$				
$C_2H_3F_2^+$	CH_3CHF_2	H	12.33	VC	118	1288
$C_2H_3F_2^+$	CH_3CF_3	F	14.9 ± 0.2	EVD	149	1075
		$C_2H_4F_2^+$				
$C_2H_4F_2^+$	CH_3CHF_2		12.68	VC	178	1288
		$C_3HF_2^+$				
$C_3HF_2^+$	$CH_2=CHCF_3$		14.8 ± 0.2	EVD		1075
		$C_3H_2F_2^+$				
$C_3H_2F_2^+$	$CH_2=CHCF_3$	HF?	13.8 ± 0.1	EVD	229	1075
		$C_3H_3F_2^+$				
$C_3H_3F_2^+$	$CH_2=CHCF_3$	F?	13.3 ± 0.15	EVD	134	1075
$C_3H_3F_2^+$	$C_2H_5CF_3$	H + HF?	13.6 ± 0.1	EVD	135	1075
		$C_3H_4F_2^+$				
$C_3H_4F_2^+$	$C_2H_5CF_3$	HF?	12.53 ± 0.04	EVD	163	1075
		$C_3H_5F_2^+$				
$C_3H_5F_2^+$	$C_2H_5CF_3$	F	14.9 ± 0.2	EVD	134	1075
		$C_4H_2F_2^+$				
$C_4H_2F_2^+$ (*o*-Difluorobenzene)	$C_6H_4F_2$	C_2H_2	15.27	EVD	230	1185
$C_4H_2F_2^+$ (*m*-Difluorobenzene)	$C_6H_4F_2$	C_2H_2	15.30	EVD	227	1185
$C_4H_2F_2^+$ (*p*-Difluorobenzene)	$C_6H_4F_2$	C_2H_2	15.27	EVD	227	1185
		$C_6H_3F_2^+$				
$C_6H_3F_2^+$ (1,2,4-Trifluorobenzene)	$C_6H_3F_3$	F	15.2 ± 0.1	SL		301

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_4F_2^+$(*o*-Difluorobenzene) Heat of formation 147 kcal mol^{-1}						
$C_6H_4F_2^+$(*p*-Difluorobenzene) 140 kcal mol^{-1}						
$C_6H_4F_2^+$ (*o*-Difluorobenzene)	$C_6H_4F_2$		9.31	PI	147*	168
$C_6H_4F_2^+$ (*o*-Difluorobenzene)	$C_6H_4F_2$		9.74 ± 0.02	EVD	157	1185
$C_6H_4F_2^+$ (*m*-Difluorobenzene)	$C_6H_4F_2$		9.78 ± 0.02	EVD	154	1185
$C_6H_4F_2^+$ (*p*-Difluorobenzene)	$C_6H_4F_2$		9.15	PI	140*	168
$C_6H_4F_2^+$ (*p*-Difluorobenzene)	$C_6H_4F_2$		9.66 ± 0.02	EVD	152	1185
$C_6H_4F_2^+$ (*p*-Difluorobenzene)	$C_6H_4F_2$		9.3 ± 0.1	SL	144	301
$C_2HF_3^+$ Heat of formation 122 kcal mol^{-1}						
$C_2HF_3^+$	C_2HF_3		10.14	PI	122*	168
$C_2HF_3^+$	C_2HF_3		10.33	VC	126	419
$C_2H_2F_3^+$						
$C_2H_2F_3^+$	CF_3CH_2		10.6 ± 0.1	SL		2164
$C_3H_2F_3^+$						
$C_3H_2F_3^+$	$CH_2{=}CHCF_3$	H	12.69 ± 0.05	EVD	87	1075
$C_3H_3F_3^+$						
$C_3H_3F_3^+$	$CH_2{=}CHCF_3$		10.9	PI	97*	168
$C_3H_3F_3^+$	$CH_2{=}CHCF_3$		11.24 ± 0.04	EVD	105	1075
$C_6H_2F_3^+$						
$C_6H_2F_3^+$ (1,2,4,5-Tetrafluorobenzene)	$C_6H_2F_4$	F	15.9 ± 0.1	SL		301
$C_6H_3F_3^+$						
$C_6H_3F_3^+$ (1,2,4-Trifluorobenzene)	$C_6H_3F_3$		9.37	PI		168
$C_6H_3F_3^+$ (1,3,5-Trifluorobenzene)	$C_6H_3F_3$		9.3	PI		168
$C_7H_5F_3^+$ Heat of formation 84 kcal mol^{-1}						
$C_7H_5F_3^+$ (Benzotrifluoride)	$C_6H_5CF_3$		9.685	S	84*	344
$C_7H_5F_3^+$ (Benzotrifluoride)	$C_6H_5CF_3$		9.68 ± 0.02	PI	84*	182
$C_7H_5F_3^+$ (Benzotrifluoride)	$C_6H_5CF_3$		10.0 ± 0.1	SL	92	301

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_{11}F_3^+$				
$C_7H_{11}F_3^+$ (Trifluoromethylcyclohexane)	$C_6H_{11}CF_3$		10.46 ± 0.02	PI	37*	182
		$C_6HF_4^+$				
$C_6HF_4^+$ (Pentafluorobenzene)	C_6HF_5	F	16.5 ± 0.1	SL		301
		$C_6H_2F_4^+$				
$C_6H_2F_4^+$ (1,2,3,4-Tetrafluorobenzene)	$C_6H_2F_4$		9.61	PI		168
$C_6H_2F_4^+$ (1,2,3,5-Tetrafluorobenzene)	$C_6H_2F_4$		9.55	PI		168
$C_6H_2F_4^+$ (1,2,4,5-Tetrafluorobenzene)	$C_6H_2F_4$		9.39	PI		168
		$C_6HF_5^+$				
$C_6HF_5^+$ (Pentafluorobenzene)	C_6HF_5		9.84	PI		168
$C_6HF_5^+$ (Pentafluorobenzene)	C_6HF_5		10.0 ± 0.1	SL		301
		$C_7H_3F_5^+$				
$C_7H_3F_5^+$ (Pentafluorotoluene)	$C_6F_5CH_3$		9.6 ± 0.1	SL		301
		$C_6F_{15}N^+$				
$C_6F_{15}N^+$	$(C_2F_5)_3N$		11.7	PI		182
		$C_7F_5O^+$				
$C_7F_5O^+$ (Perfluoroacetophenone)	$C_6F_5COCF_3$	CF_3	11.15	SL		308
$C_7F_5O^+$ (Pentafluorobenzaldehyde)	C_6F_5CHO	H	11.6	SL		308
$C_7F_5O^+$ (Pentafluoroacetophenone)	$C_6F_5COCH_3$	CH_3	11.25	SL		308
$C_7F_5O^+$ (Pentafluorobenzamide)	$C_6F_5CONH_2$	NH_2?	11.3 ± 0.2	SL		1168
		$C_8F_8O^+$				
$C_8F_8O^+$ (Perfluoroacetophenone)	$C_6F_5COCF_3$		11.05	SL		308
		CH_2BF^+				
CH_2BF^+	CH_3BF_2	HF?	13.38 ± 0.02	SL	179	1076
		CH_3BF^+				
CH_3BF^+	CH_3BF_2	F	15.05 ± 0.1	SL	134	1076

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_2BF^+$				
$C_2H_2BF^+$	$CH_2{=}CHBF_2$	$H+F^-$?	12.69 ± 0.05	SL	115	1076
$C_2H_2BF^+$	$C_2H_5BF_2$	$HF+H_2$	12.0 ± 0.2	SL	128	1076
$C_2H_2BF^+$	$C_2H_5BF_2$		15.0 ± 0.2	SL		1076
		$C_2H_3BF^+$				
$C_2H_3BF^+$	$CH_2{=}CHBF_2$	F^-?	11.9 ± 0.2	SL	149	1076
$C_2H_3BF^+$	$CH_2{=}CHBF_2$	F	15.5 ± 0.2	SL	149	1076
$C_2H_3BF^+$	$C_2H_5BF_2$	H_2+F^-?	12.0 ± 0.2	SL	127	1076
$C_2H_3BF^+$	$C_2H_5BF_2$	$HF+H$	14.9 ± 0.2	SL	142	1076
$C_2H_3BF^+$	*iso*-$C_3H_7BF_2$	CH_4+F^-?	11.8 ± 0.1	SL	136	1076
		$C_2H_4BF^+$				
$C_2H_4BF^+$	$C_2H_5BF_2$	HF	12.6 ± 0.2	SL	141	1076
		$C_2H_5BF^+$				
$C_2H_5BF^+$	$C_2H_5BF_2$	F^-?	12.1 ± 0.2	SL	130	1076
$C_2H_5BF^+$	$C_2H_5BF_2$	F	15.6 ± 0.2	SL	127	1076
		$CH_3BF_2^+$				
$CH_3BF_2^+$	CH_3BF_2		12.54 ± 0.03	SL	95	1076
		$C_2H_3BF_2^+$				
$C_2H_3BF_2^+$	$CH_2{=}CHBF_2$		11.06 ± 0.03	SL	65	1076
$C_2H_3BF_2^+$	*iso*-$C_3H_7BF_2$	CH_4	12.80 ± 0.05	SL	94	1076
		$C_2H_4BF_2^+$				
$C_2H_4BF_2^+$	*iso*-$C_3H_7BF_2$	CH_3	12.58 ± 0.05	SL	38	1076
		$C_2H_5BF_2^+$				
$C_2H_5BF_2^+$	$C_2H_5BF_2$		11.8 ± 0.05	SL	58	1076
		$C_8H_{10}NF^+$				
$C_8H_{10}NF^+$ (N,N-Dimethyl-p-Fluoroaniline)	$C_6H_4FN(CH_3)_2$		7.50	CTS	150	1281
		$C_6H_5OF^+$				
$C_6H_5OF^+$ (o-Fluorophenol)	C_6H_4FOH		8.66 ± 0.01	PI	132*	182
		$C_7H_5OF^+$				
$C_7H_5OF^+$ (Benzoyl fluoride)	C_6H_5COF		10.6	SL	190	308
		$C_8H_5OF_3^+$				
$C_8H_5OF_3^+$ (Trifluoroacetophenone)	$C_6H_5COCF_3$		10.25	SL		308

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_3OF_5^+$				
$C_8H_3OF_5^+$ (Pentafluoroacetophenone)	$C_6F_5COCH_3$		11.25	SL		308
		$C_5H_3OF_7^+$				
$C_5H_3OF_7^+$	n-$C_3F_7COCH_3$		10.58 ± 0.03	PI		182
		$C_7H_2NOF_5^+$				
$C_7H_2NOF_5^+$ (Pentafluorobenzamide)	$C_6F_5CONH_2$		10.0 ± 0.1	SL		1168
		$C_{19}H_{10}N_4O_2F_6^+$				
$C_{19}H_{10}N_4O_2F_6^+$ (1,3-Di-(2-Phenyl-1,3,4-oxadiazol-5-Yl)perfluoropropane)	$(C_6H_5C_2N_2O)_2C_3F_6$		9.5 ± 0.1	SL		2156
		$C_{11}H_5N_2OF_7^+$				
$C_{11}H_5N_2OF_7^+$ (2-Phenyl-5-perfluoropropyl-1,3,4-oxadiazole)	$C_6H_5C_2N_2OC_3F_7$		9.8 ± 0.2	SL		2156
		$C_{15}H_5N_2OF_{15}^+$				
$C_{15}H_5N_2OF_{15}^+$ (2-Phenyl-5-perfluoroheptyl-1,3,4-oxadiazole)	$C_6H_5C_2N_2C_7F_{15}$		9.9 ± 0.1	SL		2156
		Na^+ Heat of formation 144 kcal mol^{-1}				
Na^+	Na		5.139	S	144*	2113
Na^+	Na		5.14	LE	144	99
Na^+	NaI	I	8.7 ± 0.3	VC		2001
		Na^{+2} Heat of formation 1235 kcal mol^{-1}				
Na^{+2}	Na		52.44	S	1235*	2113
Na^{+2}	Na		52 ± 1	NRE	1225	99
		Na^{+3} Heat of formation 2888 kcal mol^{-1}				
Na^{+3}	Na		124.11	S	2888*	2113
Na^{+3}	Na		125 ± 2	NRE	2908	99
		Na_2^+				
Na_2^+	Na_2		4.90 ± 0.01	PI	146*	1189
		Mg^+ Heat of formation 212 kcal mol^{-1}				
Mg^+	Mg		7.646	S	212*	2113
Mg^+	Mg		7.6 ± 0.2	VC	211	1104
Mg^+	$MgCl_2$	2Cl	17.5 ± 0.5	VC	250	178
Mg^+	$MgBr_2$	2Br	15.5 ± 1	VC	229	178

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		MgF^+				
MgF^+	MgF		7.8±0.3	VC	127	1104
MgF^+	MgF		7.8±0.3	VC	127	2148
MgF^+	MgF_2	F	13.5±0.4	VC	119	178
MgF^+	MgF_2	F	13.7±0.4	VC	124	1104
		MgF_2^+				
MgF_2^+	MgF_2		13.5±0.4	VC	138	178
		$Mg_2F_3^+$				
$Mg_2F_3^+$	Mg_2F_4	F?	14.0±0.5	VC	−108	178
		Al^+ Heat of formation 216 kcal mol^{-1}				
Al^+	Al		5.986	S	216*	2113
Al^+	Al		5.986	S	216*	2199
Al^+	Al		6.0±0.5	LE	216	2128
Al^+	Al		6.0±0.3	VC	216	1104
Al^+	Al		6.1±0.3	VC	219	2165
Al^+	AlF	F^-?	9.2±0.3	VC	215	2148
		AlO^+				
AlO^+	AlO		9.5±0.5	LE	241	2128
		Al_2O^+				
Al_2O^+	Al_2O		7.7±0.5	LE	147	2128
		$Al_2O_2^+$				
$Al_2O_2^+$	Al_2O_2		9.9±0.5	LE	134	2128
		AlF^+ Heat of formation 166 kcal mol^{-1}				
AlF^+	AlF		8.9±0.6	VC	144	2142
AlF^+	AlF		9.7±0.5	VC	162*	1104
AlF^+	AlF		9.7±0.3	VC	162*	2148
AlF^+	AlF		9.9±0.3	VC	167*	1104
AlF^+	AlF		10.1±0.3	VC	171*	1104
		AlF_2^+				
AlF_2^+	AlF_2		9±1	VC	58	2148
AlF_2^+	AlF_3	F?	15.2±0.3	VC	44	1104
AlF_2^+	AlF_3	F?	15.2±0.3	VC	44	2148
		Si^+ Heat of formation 297 kcal mol^{-1}				
Si^+	Si		8.151	S	297*	2113
Si^+	Si		8.1	LE	296	1116
Si^+	SiH_4	$2H_2$	11.7±0.2	LE	278	2116
Si^+	SiH_4	H_2+2H	16.4±0.2	LE	282	2116
Si^+	SiH_4	4H	20.8±0.2	LE	280	2116
Si^+	$(CH_3)_3SiH$	$CH_4+C_2H_6$?	13.7±0.3	EVD	312	83
Si^+	Si_2H_6	$Si+3H_2$	15.2±0.3	LE	261	2133

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		Si_2^+				
Si_2^+	Si_2		7.3	LE	310	1116
Si_2^+	Si_2		7.4 ± 0.3	LE	313	333
Si_2^+	Si_2H_6	$3H_2$	12.2 ± 0.3	LE	301	2133
		Si_3^+				
Si_3^+	Si_3		8.0 ± 0.3	LE	332	333
		SiH^+				
SiH^+	SiH_4	$H_2 + H$	16.1 ± 0.2	LE	327	2116
SiH^+	SiH_4	3H	20.4 ± 0.5	LE	322	2116
SiH^+	$(CH_3)_3SiH$		14.2 ± 0.2	EVD		83
		SiH_2^+				
SiH_2^+	SiH_4	H_2	11.91 ± 0.02	SL	283	2182
SiH_2^+	SiH_4	H_2	12.1 ± 0.2	LE	287	2116
SiH_2^+	SiH_4	2H	16.5 ± 0.3	LE	285	2116
SiH_2^+	CH_3SiH_3	CH_4	11.62 ± 0.1	SL		2182
SiH_2^+	$C_2H_5SiH_3$	C_2H_6	12.0 ± 0.1	SL	265	2182
SiH_2^+	Si_2H_6	SiH_4	11.94 ± 0.04	SL	286	2183
		SiH_3^+				
SiH_3^+	SiH_4	H	12.40 ± 0.02	SL	242	2182
SiH_3^+	SiH_4	H	11.8 ± 0.2	LE	228	173
SiH_3^+	SiH_4	H	11.8 ± 0.2	LE	228	2116
SiH_3^+	SiH_4	H	11.81 ± 0.09	LE	229	2002
SiH_3^+	CH_3SiH_3	CH_3	12.80 ± 0.1	SL		2182
SiH_3^+	$C_2H_5SiH_3$	C_2H_5	12.8 ± 0.2	SL	238	2182
SiH_3^+	*iso*-$C_3H_7SiH_3$	*iso*-C_3H_7	13.1 ± 0.2	SL	247	2182
SiH_3^+	$(CH_3)_3SiH$		14.3 ± 0.5	EVD		83
SiH_3^+	*tert*-$C_4H_9SiH_3$	*tert*-C_4H_9	13.7 ± 0.2	SL		2182
SiH_3^+	Si_2H_6	SiH_3	11.85 ± 0.05	SL		2183
SiH_3^+	Si_2H_6	SiH_3	11.31 ± 0.12	LE		2002
SiH_3^+	Si_2H_6	SiH_3	11.3 ± 0.2	LE		173
SiH_3^+	$SiPH_5$	PH_2	11.5 ± 0.2	LE		173
SiH_3^+	$GeSiH_6$	GeH_3	12.01 ± 0.09	LE	266	2002
		$Si_2H_6^+$				
$Si_2H_6^+$	Si_2H_6		10.6 ± 0.3	LE	264	2133
		SiB^+				
SiB^+	SiB		7.8	LE	355	1116
		SiC^+				
SiC^+	SiC		9.0	LE	385	1116
SiC^+	SiC		9.2 ± 0.4	LE	389	333

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		SiC_2^+				
SiC_2^+	SiC_2		10.2 ± 0.3	LE	382	333
SiC_2^+	SiC_2		10.2	LE	382	1116
		Si_2C^+				
Si_2C^+	Si_2C		9.1	LE	342	1116
Si_2C^+	Si_2C		9.2 ± 0.3	LE	344	333
		$Si_2C_2^+$				
$Si_2C_2^+$	Si_2C_2		8.2 ± 0.3	LE	357	333
		$Si_2C_3^+$				
$Si_2C_3^+$	Si_2C_3		9.2 ± 0.3	LE	389	333
		Si_3C^+				
Si_3C^+	Si_3C		8.2 ± 0.3	LE	351	333
		SiO^+				
SiO^+	SiO		10.51	S	219	2150
		SiF^+				
SiF^+	SiF		7.26	S	168	2149
		SiF_4^+				
SiF_4^+	SiF_4		15.4 ± 0.4	SL	−31	74
		$CHSi^+$				
$CHSi^+$	$(CH_3)_3SiH$		11.7 ± 0.5	EVD		83
		CH_2Si^+				
CH_2Si^+	$(CH_3)_3SiH$		10.6 ± 0.3	EVD		83
		CH_3Si^+				
CH_3Si^+	$(CH_3)_3SiH$		12.4 ± 0.3	EVD		83
CH_3Si^+	$(CH_3)_4Si$		17.1 ± 0.4	EVD		82
		CH_4Si^+				
CH_4Si^+	$(CH_3)_3SiH$		11.0 ± 0.3	EVD		83
		CH_5Si^+				
CH_5Si^+	$(CH_3)_3SiH$		12.8 ± 0.5	EVD		83
		$C_2H_6Si^+$				
$C_2H_6Si^+$	$(CH_3)_3SiH$	CH_4	10.3 ± 0.2	EVD	213	83
$C_2H_6Si^+$	$(CH_3)_4Si$	$2CH_3$	13.9 ± 0.3	EVD	197	82

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_7Si^+$				
$C_2H_7Si^+$	$(CH_3)_2SiH_2$	H	11.94 ± 0.04	RPD		1421
$C_2H_7Si^+$	$(CH_3)_3SiH$	CH_3	11.70 ± 0.06	RPD	195	1421
$C_2H_7Si^+$	$(CH_3)_3SiH$	CH_3	11.9 ± 0.3	EVD	199	83
		$C_2H_8Si^+$				
$C_2H_8Si^+$	$C_2H_5SiH_3$		10.18 ± 0.05	SL	203	2182
		$C_3H_9Si^+$ Heat of formation 155 kcal mol^{-1}				
$C_3H_9Si^+$	$(CH_3)_3SiH$	H	10.78 ± 0.07	RPD	(a)	1421
$C_3H_9Si^+$	$(CH_3)_3SiH$	H	10.9 ± 0.2	EVD		83
$C_3H_9Si^+$	$(CH_3)_3SiH$	H	10.72 ± 0.1	NS		2055
$C_3H_9Si^+$	$(CH_3)_4Si$	CH_3	10.63 ± 0.13	RPD	155*	1421
$C_3H_9Si^+$	$(CH_3)_4Si$	CH_3	11.3 ± 0.15	EVD	170	82
$C_3H_9Si^+$	$(CH_3)_4Si$	CH_3	10.53 ± 0.1	NS	152	2055
$C_3H_9Si^+$	$(CH_3)_3SiC_2H_5$	C_2H_5	10.53 ± 0.09	RPD	(a)	1421
$C_3H_9Si^+$	$(CH_3)_3SiC_2H_5$	C_2H_5	10.34 ± 0.11	NS		2055
$C_3H_9Si^+$	*iso*-$C_3H_7Si(CH_3)_3$	*iso*-C_3H_7	10.56 ± 0.16	RPD	(a)	1421
$C_3H_9Si^+$	*tert*-$C_4H_9Si(CH_3)_3$	*tert*-C_4H_9	10.53 ± 0.09	RPD	(a)	1421
$C_3H_9Si^+$ (Benzyltrimethylsilane)	$C_6H_5CH_2Si(CH_3)_3$	$C_6H_5CH_2$	10.05 ± 0.1	NS		2055
$C_3H_9Si^+$	$(CH_3)_3SiSi(CH_3)_3$	$Si(CH_3)_3$	10.69 ± 0.04	RPD		1421
$C_3H_9Si^+$	$(CH_3)_3SiSi(CH_3)_3$	$Si(CH_3)_3$	10.03 ± 0.1	NS		2055
$C_3H_9Si^+$	$(CH_3)_3SiN(C_2H_5)_2$	$N(C_2H_5)_2$	12.61 ± 0.03	RPD	(a)	1421
$C_3H_9Si^+$	$(CH_3)_3SiOCH_3$	OCH_3	12.43 ± 0.18	RPD	(a)	1421
$C_3H_9Si^+$	$(CH_3)_3SiOSi(CH_3)_3$	$OSi(CH_3)_3$	15.36 ± 0.13	RPD	(b)	1421
$C_3H_9Si^+$	$(CH_3)_3SiF$	F^-?	11.7 ± 0.5	RPD		1421
$C_3H_9Si^+$	$(CH_3)_3SiCl$	Cl	12.40 ± 0.06	RPD	173	1421
$C_3H_9Si^+$	$(CH_3)_3SiCl$	Cl	11.5 ± 0.2	NS	152	2055
$C_3H_9Si^+$	$(CH_3)_3SiBr$	Br	10.69 ± 0.06	RPD	(a)	1421
$C_3H_9Si^+$	$(CH_3)_3SiHgSi(CH_3)_3$		8.56 ± 0.1	NS		2055
		$C_3H_{10}Si^+$				
$C_3H_{10}Si^+$	*iso*-$C_3H_7SiH_3$		9.85 ± 0.1	SL	189	2182
$C_3H_{10}Si^+$	$(CH_3)_3SiH$		9.8 ± 0.3	EVD	184	83
		$C_4H_{11}Si^+$				
$C_4H_{11}Si^+$	$(CH_3)_3SiC_2H_5$	CH_3	11.41 ± 0.06	RPD	167	1421
		$(CH_3)_4Si^+$ Heat of formation 171 kcal mol^{-1}				
$C_4H_{12}Si^+$	*tert*-$C_4H_9SiH_3$		9.5 ± 0.2	SL		2182
$C_4H_{12}Si^+$	$(CH_3)_4Si$		9.98 ± 0.03	RPD	173*	1421
$C_4H_{12}Si^+$	$(CH_3)_4Si$		9.8	EC	169	218
$C_4H_{12}Si^+$	$(CH_3)_4Si$		9.8 ± 0.15	EVD	169*	82
		$C_5H_{14}Si^+$				
$C_5H_{14}Si^+$	$(CH_3)_3SiC_2H_5$		9.70 ± 0.01	RPD	161	1421
		$C_6H_{16}Si^+$				
$C_6H_{16}Si^+$	*iso*-$C_3H_7Si(CH_3)_3$		9.50 ± 0.03	RPD	147	1421
		$C_7H_{18}Si^+$				
$C_7H_{18}Si^+$	*tert*-$C_4H_9Si(CH_3)_3$		9.34 ± 0.06	RPD	132	1421

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_{15}Si_2^+$				
$C_5H_{15}Si_2^+$	$(CH_3)_3SiSi(CH_3)_3$	CH_3	10.74 ± 0.08	RPD	89	1421
		$C_6H_{18}Si_2^+$				
$C_6H_{18}Si_2^+$	$(CH_3)_3SiSi(CH_3)_3$		8.79 ± 0.08	RPD	77	1421
		$BCSi^+$				
$BCSi^+$	BCSi		9.9	LE	394	1116
		$C_7H_{19}SiN^+$				
$C_7H_{19}SiN^+$	$(CH_3)_3SiN(C_2H_5)_2$		8.06 ± 0.02	RPD	88	1421
		$C_3H_9SiO^+$				
$C_3H_9SiO^+$	$(CH_3)_3SiOCH_3$	CH_3	10.25 ± 0.05	RPD	71	1421
		$C_4H_{12}SiO^+$				
$C_4H_{12}SiO^+$	$(CH_3)_3SiOCH_3$		9.79 ± 0.04	RPD	94	1421
		$C_5H_{15}Si_2O^+$				
$C_5H_{15}Si_2O^+$	$(CH_3)_3SiOSi(CH_3)_3$	CH_3	10.20 ± 0.07	RPD	16	1421
		$C_6H_{18}Si_2O^+$				
$C_6H_{18}Si_2O^+$	$(CH_3)_3SiOSi(CH_3)_3$		9.59 ± 0.04	RPD	35	1421
		$C_2H_6SiF^+$				
$C_2H_6SiF^+$	$(CH_3)_3SiF$	CH_3	11.11 ± 0.05	RPD		1421
		$C_3H_9SiF^+$				
$C_3H_9SiF^+$	$(CH_3)_3SiF$		10.55 ± 0.06	RPD		1421
		P^+ Heat of formation 328 kcal mol^{-1}				
P^+	P		10.980	S	328*	2113
P^+	P		11	VC	329	8
P^+	P_2	P	16	VC	328	8
P^+	P_2H_4	P^+2H_2?	16.7 ± 0.3	LE	315	2133
P^+	P_4	P_3?	14	VC		8
P^+	P_4	P^+P_2?	18	VC	319	8
P^+	P_4		20	VC		8
P^+	P_4	3P?	23.5	VC	330	8
P^+	P_4		26.5	VC		8
P^+	PH_3	$H_2 + H$	16.0 ± 1	VC	318	1036
P^+	PH_3	$H_2 + H$	17.2 ± 0.2	EVD	346	1033
P^+	PH_3	$H_2 + H$	16.5 ± 0.2	LE	330	2116
P^+	PH_3		20 ± 1	LE		1036
P^+	PH_3	3H	20.8 ± 0.3	LE	325	2116
P^+	$(CH_3)_2PH$		11.9	LE		1036
P^+	PCl_3	3Cl	21.2 ± 0.5	EVD	333	192
P^+	PCl_3	3Cl	21.0 ± 0.5	NS	328	1101
P^+	$POCl_3$		21.4	NS		1101

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
P^{+2} Heat of formation 782 kcal mol^{-1}						
P^{+2}	P		30.637	S	782*	2113
P^{+2}	P^+		17.5	VC		8
P^{+2}	P_4	$P_2 + P$?	38	VC	781	8
P^{+2}	P_4	$2P + P^+$?	55	VC		8
P^{+2}	PH_3	3H	42 ± 2	LE	814	1036
P^{+2}	PH_3	3H	42 ± 2	NRE	814	1036
P_2^+						
P_2^+ (Excited parent molecule)	P_2		10	VC		8
P_2^+	P_2		12	VC	311	8
P_2^+	P_2		13	VC		8
P_2^+	P_4	P_2	14.3	VC	309	8
P_2^+	P_4		15.5	VC		8
P_2^+	P_2H_4	$2H_2$	12.2	EC	286	1033
P_2^+	P_2H_4	$2H_2$	13.7 ± 0.3	LE	321	2133
P_2^+	P_2Cl_4	$Cl_2 + 2Cl$?	19.7 ± 0.4	EVD	290	192
P_3^+						
P_3^+	P_3		11.5	VC		8
P_3^+	P_3		13.2	VC		8
P_3^+	P_4	P	14.5	VC	273	8
P_3^+	P_4	P	17.5	VC		8
P_4^+						
P_4^+	P_4		9	VC	222	8
P_4^+	P_4		10	VC		8
P_4^+	P_4		11.5	VC		8
P_4^+	P_4		12	VC		8
P_4^+	P_4		12.5	VC		8
P_4^+	P_4		13.7	VC		8
P_4^+	P_4		14.2	VC		8
PH^+						
PH^+	PH_3	H_2	13.3 ± 0.2	EVD	308	1033
PH^+	PH_3	H_2	13.1 ± 0.2	VC	303	1036
PH^+	PH_3	H_2	12.4 ± 0.2	LE	287	2116
PH^+	PH_3	H_2	13.6	LE	315	1036
PH^+	PH_3	2H	16.4 ± 0.4	LE	275	2116
PH^{+2}						
PH^{+2}	PH_3	2H?	25.1	NRE	476	1036
PH^{+2}	PH_3	2H?	21.2	LE	386	1036
PH_2^+						
PH_2^+	PH_3	H	13.2 ± 0.2	EVD	254	1033
PH_2^+	PH_3	H	14.0 ± 0.2	VC	272	1036
PH_2^+	PH_3	H	13.2 ± 0.2	LE	254	173
PH_2^+	PH_3	H	13.4 ± 0.2	LE	258	2116
PH_2^+	PH_3	H	14.4	LE	281	1036
PH_2^+	P_2H_4	PH_2	12.5 ± 0.2	LE	263	173
PH_2^+	$SiPH_5$	SiH_3	13.1 ± 0.2	LE		173

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		PH_2^{2+}				
PH_2^{+2}	PH_3	H	34.0	NRE	733	1036
PH_2^{+2}	PH_3	H	32.7	LE	703	1036
		PH_3^+ Heat of formation 231 kcal mol^{-1}				
PH_3^+	PH_3		9.98	PI	231*	1091
PH_3^+	PH_3		10.2 ± 0.2	EVD	237	1033
PH_3^+	PH_3		10.4 ± 0.3	SL	241	1407
PH_3^+	PH_3		10.4 ± 0.3	VC	241	1036
PH_3^+	PH_3		10.3 ± 0.5	LE	239	1036
PH_3^+	PH_3		11.5 ± 0.3	LE	267	2116
PH_3^+	PH_3		10.3	EC	239	218
PH_3^+	$C_2H_5PH_2$	C_2H_4	11.2 ± 0.2	EVD	234	2045
PH_3^+	$(C_2H_5)_3P$	$3C_2H_4$?	14.7 ± 0.2	EVD	264	2045
		PH_2D^+				
PH_2D^+	PH_2D		10.1 ± 0.2	EVD		1033
		PHD_2^+				
PHD_2^+	PHD_2		10.2 ± 0.2	EVD		1033
		PD_3^+				
PD_3^+	PD_3		10.1 ± 0.2	EVD		1033
		PH_3^{+2}				
PH_3^{+2}	PH_3		15.6	NRE	361	1036
PH_3^{+2}	PH_3		15.0	LE	347	1036
		PH_4^+ Heat of formation 174 kcal mol^{-1}				
PH_4^+				D	174*	1414
PH_4^+	$(CH_3)_3P$		14.2 ± 0.2	EVD		2045
PH_4^+	$(C_2H_5)_3P$		14.7 ± 0.3	EVD		2045
		P_2H^+				
P_2H^+	P_2H_4	$H_2 + H$	13.6 ± 0.3	LE	267	2133
P_2H^+	P_2H_4	$H_2 + H$	13.2	EC	257	1033
		$P_2H_2^+$				
$P_2H_2^+$	P_2H_4	H_2	12.7 ± 0.3	LE	298	2133
$P_2H_2^+$	P_2H_4	H_2	10.5	EC	247	1033
		$P_2H_3^+$				
$P_2H_3^+$	P_2H_4	H	11.3 ± 0.3	LE	214	2133
$P_2H_3^+$	P_2H_3		8.9	EC		1033
$P_2H_3^+$	P_2H_3		9.1	EC		1033

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$P_2H_4^+$				
$P_2H_4^+$	P_2H_4		10.6 ± 0.3	LE	249	2133
$P_2H_4^+$	P_2H_4		8.7 ± 0.3	EC	206	1033
		$P_2H_3D^+$				
$P_2H_3D^+$	P_2H_3D		8.4 ± 0.3	EC		1033
		$P_2H_2D_2^+$				
$P_2H_2D_2^+$	$P_2H_2D_2$		8.2 ± 0.5	EC		1033
		PC^+				
PC^+	CH_3PH_2	$2H_2 + H$	14.5 ± 0.3	EVD	275	2045
PC^+	$C_2H_5PH_2$	$CH_3 + 2H_2$?	12.0 ± 0.3	EVD	232	2045
PC^+	$(CH_3)_3P$		13.2 ± 0.3	EVD		2045
PC^+	$(C_2H_5)_3P$		19.1 ± 0.5	EVD		2045
		PO^+				
PO^+	$(CH_3O)_2PHO$		16.3	LE		1036
PO^+	$POCl_3$	$Cl_2 + Cl^-$?	14.5 ± 0.5	NS	260	1101
		PO_3^+				
PO_3^+	$(CH_3O)_2PHO$		13.5	LE		1036
		PF_3^+				
PF_3^+	PF_3		9.71	PI	4*	1091
		AlP^+				
AlP^+	AlP		8.4 ± 0.4	LE	297	2152
		CHP^+				
CHP^+	CH_3PH_2	$2H_2$	14.7 ± 0.3	EVD	332	2045
CHP^+	$C_2H_5PH_2$	$CH_4 + H_2$?	13.1 ± 0.5	EVD	308	2045
CHP^+	$(CH_3)_2PH$	$CH_4 + H_2$?	14.1	LE	328	1036
CHP^+	$(CH_3)_3P$	$2CH_3 + H_2$?	18.4 ± 0.2	EVD	335	2045
		CH_2P^+				
CH_2P^+	CH_3PH_2	$H_2 + H$	14.7 ± 0.2	EVD	280	2045
CH_2P^+	$C_2H_5PH_2$	$CH_3 + H_2$?	12.7 ± 0.4	EVD	248	2045
CH_2P^+	$(CH_3)_3P$		16.1 ± 0.4	EVD		2045
CH_2P^+	$(CH_3)_3P$		17 ± 1	VC		1036
		CH_3P^+				
CH_3P^+	$C_2H_5PH_2$	CH_4?	12.0 ± 0.2	EVD	283	2045
CH_3P^+	$(CH_3)_2PH$	CH_4?	11.9	LE	277	1036
CH_3P^+	$(CH_3)_3P$	$C_2H_4 + H_2$?	14.0 ± 0.3	EVD	287	2045
CH_3P^+	$(C_2H_5)_3P$		17.9 ± 0.5	EVD		2045
CH_3P^+	CH_3PH_2	H_2	12.2 ± 0.2	EVD	274	2045

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CH_4P^+				
CH_4P^+	CH_3PH_2	H	11.6 ± 0.12	EVD	208	2045
CH_4P^+	$C_2H_5PH_2$	CH_3	12.2 ± 0.2	EVD	236	2045
CH_4P^+	$(CH_3)_3P$		14.7 ± 0.2	EVD		2045
CH_4P^+	$(C_2H_5)_3P$		15.8 ± 0.2	EVD		2045
		CH_5P^+				
CH_5P^+	CH_3PH_2		9.72 ± 0.15	EVD	217*	2045
		$C_2H_2P^+$				
$C_2H_2P^+$	$C_2H_5PH_2$	$2H_2 + H$	15.8 ± 0.3	EVD	300	2045
$C_2H_2P^+$	$(CH_3)_3P$	$CH_3 + 2H_2$?	16.7 ± 0.2	EVD	329	2045
$C_2H_2P^+$	$(C_2H_5)_3P$		16.5 ± 0.3	EVD		2045
		$C_2H_3P^+$				
$C_2H_3P^+$	$C_2H_5PH_2$	$2H_2$	12.9 ± 0.4	EVD	286	2045
$C_2H_3P^+$	$(C_2H_5)_3P$		16.7 ± 0.2	EVD		2045
		$C_2H_4P^+$				
$C_2H_4P^+$	$C_2H_5PH_2$	$H_2 + H$	12.9 ± 0.3	EVD	233	2045
$C_2H_4P^+$	$(CH_3)_3P$	$CH_3 + H_2$?	14.0 ± 0.2	EVD	266	2045
$C_2H_4P^+$	$(CH_3)_3P$	$CH_3 + H_2$?	15 ± 1	VC	290	1036
$C_2H_4P^+$	$(C_2H_5)_3P$	$2C_2H_5 + H$?	16.0 ± 0.2	EVD	229	2045
		$C_2H_5P^+$				
$C_2H_5P^+$	$C_2H_5PH_2$	H_2	12.0 ± 0.2	EVD	265	2045
$C_2H_5P^+$	$(C_2H_5)_3P$		13.4 ± 0.5	EVD		2045
		$C_2H_6P^+$ Heat of formation 214 kcal mol^{-1}				
$C_2H_6P^+$	$C_2H_5PH_2$	H	12.0 ± 0.3	EVD	213*	2045
$C_2H_6P^+$	$(CH_3)_2PH$	H	12.2	LE	214	1036
$C_2H_6P^+$	$(CH_3)_3P$	CH_3	11.7 ± 0.2	EVD	213*	2045
$C_2H_6P^+$	$(CH_3)_3P$	CH_3	11.8 ± 0.2	VC	216*	1036
$C_2H_6P^+$	$(C_2H_5)_3P$		14.0 ± 0.2	EVD		2045
		$C_2H_7P^+$				
$C_2H_7P^+$	$C_2H_5PH_2$		9.47 ± 0.5	EVD	206	2045
$C_2H_7P^+$	$(CH_3)_2PH$		9.7	LE	209	1036
$C_2H_7P^+$	$(C_2H_5)_3P$	$2C_2H_4$?	12.7 ± 0.2	EVD	230	2045
		$C_3H_8P^+$				
$C_3H_8P^+$	$(CH_3)_3P$	H	10.2 ± 0.5	EVD	160	2045
$C_3H_8P^+$	$(CH_3)_3P$	H	11.8 ± 0.2	VC	197	1036
$C_3H_8P^+$	$(C_2H_5)_3P$		13.8 ± 0.5	EVD		2045
		$C_3H_9P^+$				
$C_3H_9P^+$	$(CH_3)_3P$		8.60 ± 0.2	EVD	175	2045
$C_3H_9P^+$	$(CH_3)_3P$		9.2 ± 0.5	VC	189	1036

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_{10}P^+$				
$C_4H_{10}P^+$	$(C_2H_5)_3P$	C_2H_5	11.4 ± 0.3	EVD	200	2045
		$C_4H_{11}P^+$				
$C_4H_{11}P^+$	$(C_2H_5)_3P$	C_2H_4	10.7 ± 0.3	EVD	196	2045
		$C_5H_{12}P^+$				
$C_5P_{12}P^+$	$(C_2H_5)_3P$	CH_3	12.0 ± 0.2	EVD	206	2045
		$C_6H_{15}P^+$				
$C_6H_{15}P^+$	$(C_2H_5)_3P$		8.27 ± 0.24	EVD	153	2045
		$C_{18}H_{15}P^+$				
$C_{18}H_{15}P^+$ (Triphenylphosphine)	$(C_6H_5)_3P$		7.36 ± 0.05	PI	242*	1140
		HPO_3^+				
HPO_3^+	$(CH_3O)_2PHO$	$2CH_3$?	11.2	LE		1036
		$C_3F_9P^+$				
$C_3F_9P^+$	$(CF_3)_3P$		11.3 ± 0.1	EVD		1007
		$SiPH_5^+$				
$SiPH_5^+$	$SiPH_5$		10.0 ± 0.2	LE		173
		$CH_4PO_3^+$				
$CH_4PO_3^+$	$(CH_3O)_2PHO$	CH_3?	11.9	LE		1036
		$C_2H_6PO_3^+$				
$C_2H_6PO_3^+$	$(CH_3O)_2PHO$	H	12.7	LE		1036
		$C_2H_7PO_3^+$				
$C_2H_7PO_3^+$	$(CH_3O)_2PHO$		10.5	LE		1036
		S^+ Heat of formation 306 kcal mol^{-1}				
S^+	S		10.360	S	306*	2113
$S^+(^2D)$	SO_2	O_2	17.5 ± 0.3	SL	333	418
$S^+(^2D)$	SO_2	2O	22.6 ± 0.2	SL	331	418
S^+ (Ethylene sulfide)	C_2H_4S	C_2H_4	13.1 ± 0.2	EVD	301	51
S^+	SnS	Sn	16.5 ± 2.0	LE	337	2139
S^+	PbS	Pb	16.0 ± 2.0	LE	354	2139

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		S_2^+				
S_2^+	S_2		9.6 ± 0.5	LE	252	2139
S_2^+	S_2		9.7 ± 0.1	LE	254	2022
S_2^+	S_2		9.7 ± 0.1	NS	254	2172
S_2^+	S_2		10.0 ± 0.3	NS	261	319
S_2^+	S_2		10.3 ± 0.2	NS	268	319
S_2^+	S_6	$2S_2$?	12.8 ± 1.0	EVD	258	1035
S_2^+	CH_3SSCH_3	$2CH_3$	15.4 ± 0.3	EVD	283	176
S_2^+	$C_2H_5SSC_2H_5$	$2C_2H_5$	14.9 ± 0.4	EVD	276	186
S_2^+	CH_3SSSCH_3	$CH_3S + CH_3$?	14.4 ± 0.3	EVD	267	84
		S_3^+				
S_3^+	S_6		13.3 ± 0.5	EVD		1035
S_3^+	S_8		12.6 ± 0.5	EVD		1035
		S_4^+				
S_4^+	S_4		10.4 ± 0.5	NS	273	2172
S_4^+	S_6	S_2	10.9 ± 0.3	EVD	245	1035
S_4^+	S_6	S_2	11.05 ± 0.3	EVD	249	1035
S_4^+	S_8		12.5 ± 0.3	EVD		1035
		S_5^+				
S_5^+	S_8		10.2 ± 0.3	EVD		1035
		S_6^+				
S_6^+	S_6		9.7 ± 0.3	EVD	248	1035
S_6^+	S_6		9.81 ± 0.3	EVD	251	1035
S_6^+	S_6		8.5 ± 0.3	NS	221	2172
S_6^+	S_8	S_2	10.1 ± 0.3	EVD	227	1035
		S_7^+				
S_7^+	S_7		9.1 ± 0.3	EVD		1035
S_7^+	S_7		9.3 ± 0.3	EVD		1035
		S_8^+				
S_8^+	S_8		9.6 ± 0.2	EVD	246	1035
S_8^+	S_8		7.3 ± 0.3	NS	193	2172
		HS^+ Heat of formation 276 kcal mol^{-1}				
HS^+	HS		10.50 ± 0.1	SL	276*	120
HS^+	H_2S	H	14.43 ± 0.1	SL	276*	120
HS^+	CH_3SCD_3	$C_2H_2D_3$	11.9	SL		307

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		H_2S^+ Heat of formation 235 kcal mol^{-1}				
H_2S^+	H_2S		10.414 ± 0.002	S	235*	387
H_2S^+	H_2S		10.425 ± 0.003	S	235*	387
H_2S^+	H_2S		10.46 ± 0.01	PI	236	182, 416, 1103
H_2S^+	H_2S		10.45 ± 0.03	RPD	236	463
H_2S^+	H_2S		12.46 ± 0.03	RPD		463
H_2S^+	H_2S		14.18 ± 0.04	RPD		463
H_2S^+	H_2S		16.07 ± 0.05	RPD		463
H_2S^+ (Ethylene sulfide)	C_2H_4S	C_2H_2	13.4 ± 0.1	EVD	275	51
H_2S^+	H_2S		10.42	PE	235	1130
H_2S^+	H_2S		12.62	PE		1130
H_2S^+	H_2S		14.82	PE		1130
H_2S^+	H_2S		18.00?	PE		1130
H_2S^+	H_2S		20.12	PE		1130
		H_3S^+				
H_3S^+	CH_3SCH_3	$C_2H_2 + H$?	14.8 ± 0.2	EVD	226	84
H_3S^+	CH_3SCH_3	$C_2H_2 + H$?	13.85	SL	204	307
H_3S^+	$CH_3SC_2H_5$	$C_2H_2 + CH_3$?	15.1 ± 0.2	EVD	247	176
H_3S^+	$CH_3SCH_2CH{=}CH_2$		14.8 ± 0.2	EVD		186
H_3S^+	n-$C_3H_7SCH_3$		15.6 ± 0.3	EVD		176
H_3S^+	$C_2H_5SC_2H_5$		15.6 ± 0.4	EVD		84
H_3S^+	$C_2H_5SSC_2H_5$		15.3 ± 0.2	EVD		186
		H_2DS^+				
H_2DS^+	CH_3SCD_3	$C_2D_2 + H$?	12.8	SL		307
		HD_2S^+				
HD_2S^+	CH_3SCD_3	$C_2H_2 + D$?	13.9	SL		307
		D_3S^+				
D_3S^+	CH_3SCD_3	$C_2H_2 + H$?	14.8	SL		307
		$H_2S_2^+$				
$H_2S_2^+$	H_2S_2		10.54	CS	246	383
$H_2S_2^+$	H_2S_2		9.90	TC	231	191
$H_2S_2^+$	H_2S_2		10.09	TC	235	191
$H_2S_2^+$	$C_2H_5SSC_2H_5$	$2C_2H_4$	12.2 ± 0.2	EVD	239	186, 191
$H_2S_2^+$	$C_2H_5SSC_2H_5$	$2C_2H_4$	11.9	SL	232	307
		CS^+				
CS^+	CS		11.8 ± 0.2	NS	328	319
CS^+	CS		11.9 ± 0.3	NS	330	319
CS^+	CH_3NCS	CH_3N?	15.6 ± 0.4	SL		315
CS^+	C_2H_5NCS	C_2H_5N?	16.1 ± 0.5	SL		315

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CS_2^+(^2\Pi_{3/2g})$ Heat of formation 261 kcal mol^{-1}				
		$CS_2^+(^2\Pi_{1/2g})$ 262 kcal mol^{-1}				
		$CS_2^+(^2\Pi_u)$ 318 kcal mol^{-1}				
		$CS_2^+(^2\Sigma_u^+)$ 362 kcal mol^{-1}				
		$CS_2^+(^2\Sigma_g^+)$ 401 kcal mol^{-1}				
$CS_2^+(^2\Pi_{3/2g})$	CS_2		10.080	S	261*	149
$CS_2^+(^2\Pi_{3/2g})$	CS_2		10.07 ± 0.01	S	260*	410
$CS_2^+(^2\Pi_{1/2g})$	CS_2		10.134	S	262*	149
$CS_2^+(^2\Pi_{1/2g})$	CS_2		10.13 ± 0.01	S	262*	410
$CS_2^+(^2\Pi_g)$	CS_2		10.08 ± 0.01	PI	261	416
$CS_2^+(^2\Pi_g)$	CS_2		10.06	PE	260	92
$CS_2^+(^2\Pi_g)$	CS_2		10.07	PE	260	1130
CS_2^+	CS_2		10.15 ± 0.05	RPD	262	164, 169
CS_2^+	CS_2		12.01 ± 0.09	RPD		164, 169
$CS_2^+(^2\Pi_u)$	CS_2		12.57	PE	318*	92
$CS_2^+(^2\Pi_u)$	CS_2		12.62	PE	319*	1130
CS_2^+	CS_2		13.60 ± 0.19	RPD		164, 169
$CS_2^+(^2\Sigma_u^+)$	CS_2		14.476	S	362*	149
$CS_2^+(^2\Sigma_u^+)$	CS_2		14.47 ± 0.01	S	362*	410
$CS_2^+(^2\Sigma_u^+)$	CS_2		14.46	PE	362	92
$CS_2^+(^2\Sigma_u^+)$	CS_2		14.52	PE	363	1130
CS_2^+	CS_2		14.76 ± 0.25	RPD		164, 169
$CS_2^+(^2\Sigma_g^+)$	CS_2		16.19	S	401*	149
$CS_2^+(^2\Sigma_g^+)$	CS_2		16.19 ± 0.01	S	401*	410
$CS_2^+(^2\Sigma_g^+)$	CS_2		16.02	PE	397	92
$CS_2^+(^2\Sigma_g^+)$	CS_2		16.17	PE	401	1130
CS_2^+	CS_2		15.90 ± 0.12	RPD	395	164, 169
CS_2^+	CS_2		16.64	PE		92
CS_2^+	CS_2		16.82	PE		1130
CS_2^+	CS_2		18.10 ± 0.36	RPD		164, 169
CS_2^+	CS_2		18.42	PE		1130
CS_2^+	CS_2		19.05	PE		92
CS_2^+	CS_2		19.31?	PE		1130
CS_2^+	CS_2		19.513	S		149
CS_2^+	CS_2		19.51 ± 0.05	S		410
		CS_2^{+2}				
CS_2^{+2}	CS_2		27.45 ± 0.2	NRE	661	1040
		CS_2^{+3}				
CS_2^{+3}	CS_2		53.6 ± 0.5	NRE	1264	1040
		NS^+				
NS^+	CH_3NCS	C_2H_3?	12.5 ± 0.2	SL	255	315

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		SO^+				
SO^+	SO_2	O	16.2 ± 0.2	SL	243	418
SO^+	SO_2	O	16.5 ± 0.2	LE	250	2022, 2172
SO^+	S_2O	S	14.5 ± 0.2	LE		2022, 2172
SO^+	SO_2F_2	O + 2F	24.3 ± 0.3	SL	258	418
		SO_2^+ Heat of formation 214 kcal mol^{-1}				
SO_2^+	SO_2		12.34 ± 0.02	PI	214*	416
SO_2^+	SO_2		12.44 ± 0.1	SL	216	418
SO_2^+	SO_2		12.5 ± 0.2	LE	217	2022, 2172
SO_2^+	SO_2		12.7 ± 0.2	LE	222	2022, 2172
SO_2^+	SO_2F_2	2F	19.9 ± 0.3	SL	(a)	418
SO_2^+	SO_2		12.32	PE	213	1130
SO_2^+	SO_2		13.17	PE		1130
SO_2^+	SO_2		16.42	PE		1130
SO_2^+	SO_2		20.07?	PE		1130
		S_2O^+				
S_2O^+	S_2O		10.3 ± 0.1	LE		2022, 2172
		SF_3^+				
SF_3^+	SF_5NF_2	$NF_2 + F_2$?	16.0 ± 0.2	VC	114	1144
		SF_4^+				
SF_4^+	SF_5NF_2	NF_3?	15.9 ± 0.2	VC	151	1144
		SF_5^+				
SF_5^+	SF_6	F	15.29	PI	45	2027
SF_5^+	SF_6	F	16.53	PI		2027
SF_5^+	SF_6	F	15.85 ± 0.15	RPD	58	196
SF_5^+	SF_6	F	17.0 ± 0.2	RPD		196
SF_5^+	SF_6	F	18.0 ± 0.2	RPD		196
SF_5^+	SF_5NF_2	NF_2?	12.0 ± 0.2	VC		1144
SF_5^+	SF_5NF_2	NF_2	14.3 ± 0.5	LE	74	1144
		CHS^+				
CHS^+ (Ethylene sulfide)	C_2H_4S	CH_3	12.3 ± 0.2	EVD	270	51
CHS^+	CH_3SCH_3	$CH_4 + H$?	15.6 ± 0.2	EVD	317	84
CHS^+ (Propylene sulfide)	C_3H_6S	$C_2H_4 + H$?	14.1 ± 0.2	EVD	280	188
CHS^+ (Trimethylene sulfide)	$(CH_2)_3S$	$C_2H_4 + H$?	13.9 ± 0.2	EVD	271	52
CHS^+	$C_2H_5SCH_3$		15.9 ± 0.4	EVD		176
CHS^+ (Thiophene)	C_4H_4S	C_3H_3?	13.0 ± 0.2	EVD	249	2166
CHS^+	$CH_3SCH_2CH{=}CH_2$	$CH_2CH{=}CH_2 + H_2$?	13.8 ± 0.3	EVD	298	186
CHS^+ (Tetrahydrothiophene)	$(CH_2)_4S$	$C_2H_5 + H_2$	13.8 ± 0.2	EVD	285	52

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CHS^+	n-$C_3H_7SCH_3$		15.2 ± 0.4	EVD		176
CHS^+	*iso*-$C_3H_7SCH_3$		16.4 ± 0.4	EVD		186
CHS^+	$C_2H_5SC_2H_5$		15.3 ± 0.5	EVD		84
CHS^+ (Deuterated benzenethiol)	C_6H_5SD	C_5H_4D?	12.7 ± 0.2	SL		1039
CHS^+ (Phenyl methyl sulfide)	$C_6H_5SCH_3$	$C_6H_5 + H_2$	14.5	SL	286	307
CHS^+ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$		12.5	SL		307
CHS^+	CH_3SSCH_3	$CH_4S + H$	15.5 ± 0.3	EVD	305	176
CHS^+	CH_3SSCH_3	$CH_4 + SH$	13.6	SL	292	307
CHS^+	$C_2H_5SSC_2H_5$		17.8 ± 0.5	EVD		186
CHS^+	CH_3NCS		12.9 ± 0.2	SL		315
CHS^+	C_2H_5NCS		15.2 ± 0.5	SL		315
CHS^+	CH_3SSSCH_3		14.5 ± 0.3	EVD		84
		CDS^+				
CDS^+ (Deuterated benzenethiol)	C_6H_5SD	C_5H_5?	12.7 ± 0.2	SL		1039
		CH_2S^+				
CH_2S^+ (Ethylene sulfide)	C_2H_4S	CH_2	12.7 ± 0.2	EVD	219	51
CH_2S^+	CH_3SCH_3	CH_4	11.2 ± 0.2	EVD	267	84
CH_2S^+ (Propylene sulfide)	C_3H_6S	$C_2H_2 + H_2$	12.4 ± 0.3	EVD	252	188
CH_2S^+ (Trimethylene sulfide)	$(CH_2)_3S$	$C_2H_2 + H_2$	11.8 ± 0.2	EVD	233	52
CH_2S^+	$C_2H_5SCH_3$	$C_2H_5 + H$	13.6 ± 0.3	EVD	222	176
CH_2S^+	$CH_3SCH_2CH{=}CH_2$		11.4 ± 0.3	EVD		186
CH_2S^+ (Tetrahydrothiophene)	$(CH_2)_4S$		13.0 ± 0.2	EVD		52
CH_2S^+	n-$C_3H_7SCH_3$		14.1 ± 0.3	EVD		176
CH_2S^+	*iso*-$C_3H_7SCH_3$		15.5 ± 0.4	EVD		186
CH_2S^+	$C_2H_5SC_2H_5$		12.5 ± 0.3	EVD		84
CH_2S^+	CH_3SSCH_3		12.2 ± 0.2	EVD		176
CH_2S^+	CH_3SSSCH_3		13.4 ± 0.3	EVD		84
		CH_3S^+ Heat of formation 218 kcal mol^{-1}				
CH_3S^+	CH_3S		8.06 ± 0.1	SL	218*	120
CH_3S^+	CH_3SCH_3	CH_3	11.7 ± 0.2	EVD	228	84
CH_3S^+	CH_3SCH_3	CH_3	11.24 ± 0.1	SL	217*	120
CH_3S^+	CH_3SCH_3	CH_3	11.3	SL	219*	307
CH_3S^+	CH_3SCD_3	CD_3	11.0	SL		307
CH_3S^+ (Propylene sulfide)	C_3H_6S	$C_2H_2 + H$	13.5 ± 0.2	EVD	225	188
CH_3S^+ (Trimethylene sulfide)	$(CH_2)_3S$	C_2H_3	12.3 ± 0.15	EVD	233	52
CH_3S^+	$C_2H_5SCH_3$	$CH_3 + CH_2$	14.7 ± 0.2	EVD	198	176
CH_3S^+	$CH_3SCH_2CH{=}CH_2$	$CH_2CH{=}CH_2$?	11.9 ± 0.2	EVD	254	186
CH_3S^+ (Tetrahydrothiophene)	$(CH_2)_4S$	$CH_2{=}C{=}CH_2$ + H?	14.0 ± 0.2	EVD	217	52

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
CH_3S^+	n-$C_3H_7SCH_3$	$C_2H_5 + CH_2$	14.0 ± 0.2	EVD	185	176
CH_3S^+	iso-$C_3H_7SCH_3$	$C_2H_5 + CH_2$	15.3 ± 0.2	EVD	213	186
CH_3S^+	$C_2H_5SC_2H_5$	$CH_3 + C_2H_4$	13.5 ± 0.2	EVD	246	84
CH_3S^+	$C_2H_5SC_2H_5$	$CH_3 + C_2H_4$	12.75	SL	228	307
CH_3S^+	$(n\text{-}C_3H_7)_2S$		12.65	SL		307
CH_3S^+	CH_3SSCH_3	CH_3S	13.0 ± 0.4	EVD	262	176
CH_3S^+	CH_3SSCH_3	CH_3S	11.1	SL	218*	307
CH_3S^+	CH_3SSCH_3	CH_3S	11.12 ± 0.1	SL	218*	120
CH_3S^+	CH_3SSSCH_3	$CH_3 + S_2$	12.9 ± 0.2	EVD	234	84
		CH_2DS^+				
CH_2DS^+	CH_3SCD_3	CHD_2	11.05	SL		307
		CHD_2S^+				
CHD_2S^+	CH_3SCD_3	CH_2D	11.55	SL		307
		CD_3S^+				
CD_3S^+	CH_3SCD_3	CH_3	11.15	SL		307
		CH_3SH^+ Heat of formation 212 kcal mol^{-1}				
CH_4S^+	CH_3SH		9.440 ± 0.005	PI	212*	182
CH_4S^+	$C_2H_5SCH_3$	$C_2H_2 + H_2$?	11.8 ± 0.2	EVD	204	176
CH_4S^+	$CH_3SCH_2CH{=}CH_2$	$CH_2{=}C{=}CH_2$?	11.5 ± 0.2	EVD	229	186
CH_4S^+	n-$C_3H_7SCH_3$	$C_2H_2 + CH_4$?	11.3 ± 0.2	EVD	205	176
CH_4S^+	iso-$C_3H_7SCH_3$	$C_2H_2 + CH_4$?	12.0 ± 0.2	EVD	219	186
CH_4S^+	CH_3SSCH_3	$CS + H_2$?	11.5 ± 0.2	EVD	204	176
CH_4S^+	CH_3SSCH_3	$CS + H_2$?	11.2	SL	197	307
		CH_5S^+				
CH_5S^+	$C_2H_5SCH_3$	$C_2H_2 + H$?	12.0 ± 0.3	EVD	156	176
CH_5S^+	n-$C_3H_7SCH_3$	$C_2H_2 + CH_3$?	11.0 ± 0.2	EVD	147	176
CH_5S^+	iso-$C_3H_7SCH_3$	$C_2H_2 + CH_3$?	12.1 ± 0.2	EVD	170	186
CH_5S^+	CH_3SSCH_3	$CS + H$?	11.9 ± 0.2	EVD	161	176
		$C_2H_2S^+$				
$C_2H_2S^+$ (Ethylene sulfide)	C_2H_4S	2H?	15.0 ± 0.2	EVD	261	51
$C_2H_2S^+$ (Propylene sulfide)	C_3H_6S	$CH_3 + H$?	15.6 ± 0.4	EVD	294	188
$C_2H_2S^+$ (Thiophene)	C_4H_4S	C_2H_2	10.8 ± 0.2	EVD	219	2166
$C_2H_2S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$		17.0 ± 0.3	EVD		52
$C_2H_2S^+$	$C_2H_5SSC_2H_5$		18.6 ± 0.5	EVD		186
		$C_2H_3S^+$				
$C_2H_3S^+$ (Ethylene sulfide)	C_2H_4S	H	11.4 ± 0.2	EVD	230	51
$C_2H_3S^+$ (Propylene sulfide)	C_3H_6S	CH_3	12.3 ± 0.3	EVD	270	188
$C_2H_3S^+$	$C_2H_5SCH_3$	$CH_3 + H_2$	13.4 ± 0.4	EVD	262	176
$C_2H_3S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$		15.7 ± 0.4	EVD		52
$C_2H_3S^+$	iso-$C_3H_7SCH_3$		16.1 ± 0.3	EVD		186
$C_2H_3S^+$	$C_2H_5SC_2H_5$		14.6 ± 0.4	EVD		84
$C_2H_3S^+$	$C_2H_5SSC_2H_5$		16.2 ± 0.3	EVD		186

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_2H_4S^+$ (Ethylene sulfide) 224 kcal mol^{-1}						
$C_2H_4S^+$ (Ethylene sulfide)	C_2H_4S		8.87 ± 0.15	EVD	224*	51
$C_2H_4S^+$ (Ethylene sulfide)	C_2H_4S		8.9	EC	225	218
$C_2H_4S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$	$C_2H_2 + H_2$	11.7 ± 0.3	EVD	208	52
$C_2H_4S^+$	$C_2H_5SC_2H_5$	$C_2H_4 + H_2$?	11.2 ± 0.2	EVD	226	84
$C_2H_4S^+$	$C_2H_5SSC_2H_5$	$C_2H_5 + SH$?	12.3 ± 0.3	EVD	207	186
$C_2H_4S^+$	$C_2H_5SSC_2H_5$	$C_2H_4 + H_2S$?	11.6	SL	243	307
$C_2H_5S^+$						
$C_2H_5S^+$	CH_3SCH_3	H	11.8 ± 0.2	EVD	211	84
$C_2H_5S^+$	$C_2H_5SCH_3$	CH_3	11.8 ± 0.2	EVD	225	176
$C_2H_5S^+$	$CH_3SCH_2CH{=}CH_2$	C_2H_3	12.0 ± 0.2	EVD	222	186
$C_2H_5S^+$	n-$C_3H_7SCH_3$	C_2H_5	11.9 ± 0.2	EVD	230	176
$C_2H_5S^+$	*iso*-$C_3H_7SCH_3$	$C_2H_3 + H_2$	13.5 ± 0.3	EVD	225	186
$C_2H_5S^+$	$C_2H_5SC_2H_5$	C_2H_5	12.0 ± 0.2	EVD	232	84
$C_2H_5S^+$	$C_2H_5SC_2H_5$	C_2H_5	11.05	SL	210	307
$C_2H_5S^+$	$(n$-$C_3H_7)_2S$	$C_2H_5 + C_2H_4$	12.2	SL	216	307
$C_2H_5S^+$	CH_3SSCH_3	SH	10.9 ± 0.2	EVD	212	176
$C_2H_5S^+$	CH_3SSCH_3	SH	11.0	SL	214	307
$C_2H_5S^+$	$C_2H_5SSC_2H_5$	C_2H_5S	12.5 ± 0.3	EVD	245	186
$C_2H_5S^+$	$C_2H_5SSC_2H_5$	C_2H_5S	11.15	SL	214	307
$C_2H_5SH^+$ Heat of formation 203 kcal mol^{-1} $CH_3SCH_3^+$ 191 kcal mol^{-1}						
$C_2H_6S^+$	C_2H_5SH		9.285 ± 0.005	PI	203*	182
$C_2H_6S^+$	C_2H_5SH		9.21 ± 0.05	CS	201	384
$C_2H_6S^+$	CH_3SCH_3		8.685 ± 0.005	PI	191*	182
$C_2H_6S^+$	CH_3SCH_3		8.70 ± 0.20	EVD	192	84
$C_2H_6S^+$	CH_3SCH_3		9.0	SL	199	307
$C_2H_6S^+$	$C_2H_5SC_2H_5$	C_2H_4	10.4 ± 0.2	EVD	207	84
$C_2H_6S^+$	$C_2H_5SC_2H_5$	C_2H_4	10.4	SL	207	307
$C_2H_3D_3S^+$						
$C_2H_3D_3S^+$	CH_3SCD_3		8.7	SL		307
$C_3H_5S^+$						
$C_3H_5S^+$ (Propylene sulfide)	C_3H_6S	H	11.2 ± 0.3	EVD	226	188
$C_3H_5S^+$	$CH_3SCH_2CH{=}CH_2$	CH_3	11.0 ± 0.2	EVD	231	186
$C_3H_6S^+$						
$C_3H_6S^+$ (Propylene sulfide)	C_3H_6S		8.6 ± 0.2	EVD	218*	188
$C_3H_6S^+$ (Trimethylene sulfide)	$(CH_2)_3S$		8.9 ± 0.15	EVD	220*	52
$C_3H_6S^+$ (Trimethylene sulfide)	$(CH_2)_3S$		8.9	EC	220	218

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_7S^+$				
$C_3H_7S^+$	n-$C_3H_7SCH_3$	CH_3	11.7 ± 0.2	EVD	217	176
$C_3H_7S^+$	iso-$C_3H_7SCH_3$	CH_3	11.7 ± 0.2	EVD	215	186
$C_3H_7S^+$	$C_2H_5SC_2H_5$	CH_3	11.6 ± 0.2	EVD	214	84
$C_3H_7S^+$	$C_2H_5SC_2H_5$	CH_3	10.65	SL	193	307
$C_3H_7S^+$	$(n$-$C_3H_7)_2S$	$CH_3 + C_2H_4$	11.55	SL	192	307
		n-$C_3H_7SH^+$ Heat of formation 198 kcal mol^{-1}				
		$C_2H_5SCH_3^+$ 183 kcal mol^{-1}				
$C_3H_8S^+$	n-C_3H_7SH		9.195 ± 0.005	PI	198*	182
$C_3H_8S^+$	$C_2H_5SCH_3$		8.70 ± 0.10	EVD	186	176
$C_3H_8S^+$	$C_2H_5SCH_3$		8.55 ± 0.01	PI	183*	182
$C_3H_8S^+$	$(n$-$C_3H_7)_2S$		10.4	SL		307
		$C_4H_4S^+$ (Thiophene) Heat of formation 229 kcal mol^{-1}				
$C_4H_4S^+$ (Thiophene)	C_4H_4S		8.860 ± 0.005	PI	229*	182
$C_4H_4S^+$ (Thiophene)	C_4H_4S		9.2 ± 0.2	EVD	237	2166
$C_4H_4S^+$ (Thiophene)	C_4H_4S		9.30	CTS	239	2031
$C_4H_4S^+$ (Deuterated benzenethiol)	C_6H_5SD	C_2HD	11.8 ± 0.2	SL		1039
$C_4H_4S^+$ (2-Ethylthiophene)	$C_4H_3SC_2H_5$	C_2H_4	11.5 ± 0.2	EVD	265	2166
$C_4H_4S^+$ (2-Propylthiophene)	$C_4H_3SC_3H_7$	C_3H_6	11.1 ± 0.2	EVD	258	2166
$C_4H_4S^+$ (2-Butylthiophene)	$C_4H_3SC_4H_9$	1-C_4H_8?	11.0 ± 0.2	EVD	256	2166
		$C_4H_3DS^+$				
$C_4H_3DS^+$ (Deuterated benzenethiol)	C_6H_5SD	C_2H_2	11.8	SL		1039
		$C_4H_7S^+$				
$C_4H_7S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$	H	12.4 ± 0.3	EVD	226	52
		$C_4H_8S^+$				
$C_4H_8S^+$	$CH_3SCH_2CH{=}CH_2$		8.70 ± 0.2	EVD	211*	186
$C_4H_8S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$		8.57 ± 0.15	EVD	190*	52
$C_4H_8S^+$ (Tetrahydrothiophene)	$(CH_2)_4S$		8.4	EC	186	218
		n-$C_4H_9SH^+$ Heat of formation 192 kcal mol^{-1}				
		n-$C_3H_7SCH_3^+$ 183 kcal mol^{-1}				
		iso-$C_3H_7SCH_3^+$ 179 kcal mol^{-1}				
		$C_2H_5SC_2H_5^+$ 175 kcal mol^{-1}				
$C_4H_{10}S^+$	n-C_4H_9SH		9.14 ± 0.02	PI	192*	182
$C_4H_{10}S^+$	n-$C_3H_7SCH_3$		8.8 ± 0.15	EVD	183*	176
$C_4H_{10}S^+$	iso-$C_3H_7SCH_3$		8.7 ± 0.2	EVD	179*	186
$C_4H_{10}S^+$	$C_2H_5SC_2H_5$		8.430 ± 0.005	PI	175*	182
$C_4H_{10}S^+$	$C_2H_5SC_2H_5$		8.49 ± 0.19	EVD	176	84
$C_4H_{10}S^+$	$C_2H_5SC_2H_5$		8.6	SL	178	307

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_5H_5S^+$				
$C_5H_5S^+$ (2-Ethylthiophene)	$C_4H_3SC_2H_5$	CH_3	11.4 ± 0.2	EVD	242*	2166
$C_5H_5S^+$ (2-Propylthiophene)	$C_4H_3SC_3H_7$	C_2H_5	11.4 ± 0.2	EVD	245*	2166
$C_5H_5S^+$ (2-Butylthiophene)	$C_4H_3SC_4H_9$	n-C_3H_7	11.3 ± 0.2	EVD	241*	2166
		$C_5H_9S^+$				
$C_5H_9S^+$	$(n\text{-}C_3H_7)_2S$	$CH_3 + H_2$?	10.9	SL	190	307
		$C_5H_{11}S^+$				
$C_5H_{11}S^+$	$(n\text{-}C_3H_7)_2S$	CH_3	11.55	SL	205	307
		***cyclo*-$C_6H_5S^+$ Heat of formation 250 kcal mol^{-1}**				
$C_6H_5S^+$ (Phenyl sulfide radical)	C_6H_5S		8.63 ± 0.1	SL	250*	120
$C_6H_5S^+$ (Deuterated benzenethiol)	C_6H_5SD	D	12.2	SL		1039
$C_6H_5S^+$ (Phenyl methyl sulfide)	$C_6H_5SCH_3$	CH_3	12.1 ± 0.1	SL	269	120
$C_6H_5S^+$ (Phenyl methyl sulfide)	$C_6H_5SCH_3$	CH_3	12.15	SL	271	307
$C_6H_5S^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$	C_2H_5	12.2	SL	274	307
		***cyclo*-$C_6H_5SH^+$ Heat of formation 217 kcal mol^{-1}**				
$C_6H_6S^+$ (Benzenethiol)	C_6H_5SH		8.32 ± 0.01	PI	217*	190
$C_6H_6S^+$ (Benzenethiol)	C_6H_5SH		9.46 ± 0.04	PI		190
$C_6H_6S^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$	C_2H_4	11.4	SL	269	307
		$C_6H_5DS^+$				
$C_6H_5DS^+$ (Deuterated benzenethiol)	C_6H_5SD		8.5 ± 0.1	SL		1039
		$C_6H_8S^+$				
$C_6H_8S^+$ (2-Ethylthiophene)	$C_4H_3SC_2H_5$		8.8 ± 0.2	EVD	215*	2166
		$C_6H_{14}S^+$				
$C_6H_{14}S^+$	$(n\text{-}C_3H_7)_2S$		8.30 ± 0.02	PI	163*	182
$C_6H_{14}S^+$	$(n\text{-}C_3H_7)_2S$		8.95	SL	178	307
		$C_7H_7S^+$				
$C_7H_7S^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$	CH_3	11.7	SL	255	307

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_8S^+$				
$C_7H_8S^+$ (Phenyl methyl sulfide)	$C_6H_5SCH_3$		8.9	SL	229*	307
		$C_7H_{10}S^+$				
$C_7H_{10}S^+$ (2-Propylthiophene)	$C_4H_3SC_3H_7$		8.6 ± 0.2	EVD	205*	2166
		$C_8H_{10}S^+$				
$C_8H_{10}S^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$		8.8	SL	221*	307
		$C_8H_{12}S^+$				
$C_8H_{12}S^+$ (2-Butylthiophene)	$C_4H_3SC_4H_9$		8.5 ± 0.2	EVD	198*	2166
		$CH_3S_2^+$				
$CH_3S_2^+$	CH_3SSCH_3	CH_3	12.1 ± 0.2	EVD	240	176
$CH_3S_2^+$	CH_3SSCH_3	CH_3	11.45	SL	225	307
$CH_3S_2^+$	$C_2H_5SSC_2H_5$		14.6 ± 0.2	EVD		186
$CH_3S_2^+$	CH_3SSSCH_3	CH_3S	12.3 ± 0.2	EVD	251	84
		$CH_4S_2^+$				
$CH_4S_2^+$	CH_3SSSCH_3	CH_2S	10.8 ± 0.2	EVD		84
		$C_2H_5S_2^+$				
$C_2H_5S_2^+$	$C_2H_5SSC_2H_5$	C_2H_5	11.5	SL	223	307
		$CH_3SSCH_3^+$ Heat of formation 189 kcal mol^{-1}				
$C_2H_6S_2^+$	CH_3SSCH_3		8.46 ± 0.03	PI	189*	182
$C_2H_6S_2^+$	CH_3SSCH_3		9.1 ± 0.2	EVD	204	176
$C_2H_6S_2^+$	CH_3SSCH_3		8.53	SL	191	411
$C_2H_6S_2^+$	CH_3SSCH_3		9.05	SL	203	307
$C_2H_6S_2^+$	$C_2H_5SSC_2H_5$	C_2H_4	10.8 ± 0.3	EVD	219	186
$C_2H_6S_2^+$	$C_2H_5SSC_2H_5$	C_2H_4	10.9	SL	221	307
		$C_4H_8S_2^+$				
$C_4H_8S_2^+$ (Thiadioxane)	$(CH_2)_4S_2$		8.5	EC	200	218
		$C_2H_5SSC_2H_5^+$ Heat of formation 173 kcal mol^{-1}				
$C_4H_{10}S_2^+$	$C_2H_5SSC_2H_5$		8.27 ± 0.03	PI	173*	182
$C_4H_{10}S_2^+$	$C_2H_5SSC_2H_5$		8.30 ± 0.15	EVD	174	186
$C_4H_{10}S_2^+$	$C_2H_5SSC_2H_5$		8.85	SL	187	307

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CH_3S_3^+$				
$CH_3S_3^+$	CH_3SSSCH_3	CH_3	11.4 ± 0.2	EVD	230	84
		$C_2H_6S_3^+$				
$C_2H_6S_3^+$	CH_3SSSCH_3		8.80 ± 0.15	EVD	203*	84
		CNS^+				
CNS^+	CH_3NCS	CH_3	14.9 ± 0.5	SL	342	315
CNS^+	C_2H_5NCS	C_2H_5	14.6 ± 0.4	SL	338	315
		C_2NS^+				
C_2NS^+	CH_3NCS	$H_2 + H$?	14.1 ± 0.3	SL	304	315
C_2NS^+	C_2H_5NCS	$CH_3 + 2H$?	16.3 ± 0.2	SL	265	315
		$COS^+(^2\Pi_{3/2g})$ Heat of formation 224 kcal mol^{-1}				
		$COS^+(^2\Pi_{1/2g})$ 225 kcal mol^{-1}				
		$COS^+(^2\Pi_u)$ 313 kcal mol^{-1}				
		$COS^+(^2\Sigma_u^+)$ 336 kcal mol^{-1}				
		$COS^+(^2\Sigma_g^+)$ 380 kcal mol^{-1}				
$COS^+(^2\Pi_{3/2g}?)$	COS		11.234	S	225	149
$COS^+(^2\Pi_{3/2g})$	COS		11.17 ± 0.01	PI	224*	190
$COS^+(^2\Pi_{1/2g}?)$	COS		11.250	S	225	149
$COS^+(^2\Pi_{1/2g})$	COS		11.21 ± 0.01	PI	225*	190
$COS^+(^2\Pi_g)$	COS		11.06	PE	221	92
$COS^+(^2\Pi_u)$	COS		15.04	PE	313*	92
$COS^+(^2\Sigma_u^+)$	COS		16.043	S	336*	149
$COS^+(^2\Sigma_u^+)$	COS		16.04 ± 0.01	S	336*	410
$COS^+(^2\Sigma_u^+)$	COS		16.04	PE	336	92
$COS^+(^2\Sigma_g^+)$	COS		17.938	S	380*	149
$COS^+(^2\Sigma_g^+)$	COS		17.94 ± 0.05	S	380*	410
$COS^+(^2\Sigma_g^+)$	COS		17.87	PE	378	92
COS^+	COS		19.9	PE		92
		SOF^+				
SOF^+	SO_2F_2	F + O	18.6 ± 0.1	SL	145	418
		SO_2F^+				
SO_2F^+	SO_2F_2	F	15.1 ± 0.2	SL	124	418
SO_2F^+	FSO_2NF_2	NF_2	13.1 ± 0.1	VC		1144
SO_2F^+	FSO_2ONF_2	$NO + F_2$	13.3 ± 0.2	VC		1144
SO_2F^+	$(FSO_2)_2NF$	FSO_2NF	13.5 ± 0.1	VC		1144
		$SO_2F_2^+$				
$SO_2F_2^+$	SO_2F_2		13.3 ± 0.1	SL	102*	418

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CHNS^+$				
$CHNS^+$	C_2H_5NCS	C_2H_4	11.38 ± 0.15	EVD	276	193, 315
		CH_2NS^+				
CH_2NS^+	C_2H_5NCS	$C_2H_2 + H$?	12.0 ± 0.3	SL	196	315
		C_2HNS^+				
C_2HNS^+	C_2H_5NCS	$CH_3 + H$?	14.0 ± 0.2	SL	264	315
		C_2HNS^{+2}				
C_2HNS^{+2}	CH_3NCS	2H?	28.0 ± 0.5	SL	573	315
		$C_2H_2NS^+$				
$C_2H_2NS^+$	CH_3NCS	H	11.9 ± 0.2	SL	254	315
$C_2H_2NS^+$	C_2H_5NCS	CH_3	12.5 ± 0.2	SL	281	315
		CH_3NCS^+ Heat of formation 245 kcal mol^{-1}				
		CH_3SCN^+ 270 kcal mol^{-1}				
$C_2H_3NS^+$	CH_3NCS		9.25 ± 0.03	PI	245*	182
$C_2H_3NS^+$	CH_3NCS		9.13 ± 0.15	SL	242	315
$C_2H_3NS^+$	CH_3SCN		10.065 ± 0.01	PI	270*	182
		$C_2H_5NCS^+$ Heat of formation 237 kcal mol^{-1}				
		$C_2H_5SCN^+$ 261 kcal mol^{-1}				
$C_3H_5NS^+$	C_2H_5NCS		9.14 ± 0.03	PI	237*	182
$C_3H_5NS^+$	C_2H_5NCS		9.10 ± 0.15	EVD	236	193, 315
$C_3H_5NS^+$	C_2H_5SCN		9.89 ± 0.01	PI	261*	182
		$C_4H_{10}NS^+$				
$C_4H_{10}NS^+$ (Methionine)	$CH_3SCH_2CH_2CH(NH_2)COOH$		10.2 ± 0.2	LE		88
		$C_7H_5NS^+$				
$C_7H_5NS^+$ (Phenyl isothiocyanate)	C_6H_5NCS		8.520 ± 0.005	PI	259*	182
$C_7H_5NS^+$ (Benzothiazole)	C_7H_5NS		8.65	CTS		1211
		$C_8H_7NS^+$				
$C_8H_7NS^+$ (Benzyl thiocyanate)	$C_6H_5CH_2SCN$		9.06 ± 0.05	CS	274*	2025
		$CH_4N_2S^+$				
$CH_4N_2S^+$	NH_2CSNH_2		8.50 ± 0.05	SL	194*	1390
		$C_2H_6N_2S^+$				
$C_2H_6N_2S^+$	$NH_2CSNHCH_3$		8.29 ± 0.05	SL	188*	1390

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_6N_2S^+$				
$C_3H_6N_2S^+$	$NH_2CSNHCH{=}CH_2$		8.29 ± 0.05	SL	213*	1390
		$C_3H_8N_2S^+$				
$C_3H_8N_2S^+$	$NH_2CSN(CH_3)_2$		8.34 ± 0.05	SL	186*	1390
$C_3H_8N_2S^+$	$CH_3NHCSNHCH_3$		8.17 ± 0.05	SL	184*	1390
		$C_4H_{10}N_2S^+$				
$C_4H_{10}N_2S^+$	$CH_3NHCSN(CH_3)_2$		7.93 ± 0.05	SL	176*	1390
		$C_5H_{12}N_2S^+$				
$C_5H_{12}N_2S^+$ (Diethyl thiourea)	$C_5H_{12}N_2S$		7.98 ± 0.05	SL	170*	1390
$C_5H_{12}N_2S^+$	$(CH_3)_2NCSN(CH_3)_2$		7.95 ± 0.05	SL	173*	1390
		$C_2H_4SO^+$				
$C_2H_4SO^+$	CH_3COSH		10.00 ± 0.02	PI		182
		$C_4H_{10}SO_3^+$				
$C_4H_{10}SO_3^+$	$(C_2H_5)_2SO_3$		9.68?	PI		182
		Cl^+ Heat of formation 329 kcal mol^{-1}				
Cl^+	Cl		13.02	S	329*	2113
Cl^+	Cl		12.83 ± 0.1	RPD	325	196
Cl^+	Cl		12.9 ± 0.15	LE	327	440
Cl^+	Cl_2	Cl^-	11.86 ± 0.04	RPD	332	288, 292
Cl^+	Cl_2	Cl	15.51 ± 0.03	RPD	329	288, 292
Cl^+	HCl	H	17.1 ± 0.15	LE	320	440
Cl^+	CCl_4	CCl_3	16.10 ± 0.2	RPD	333	196
Cl^+	$MgCl_2$	MgCl	19 ± 1.0	NS	353	178
Cl^+	PCl_3	PCl_2^-?	14 ± 1	NS		1101
Cl^+	PCl_3	PCl + Cl?	20.2 ± 0.4	EVD	(b)	192
Cl^+	PCl_3	PCl + Cl?	19.8 ± 0.4	NS	331	1101
Cl^+	CH_3Cl	CH_3^-?	15.6 ± 0.05	RPD		2154
Cl^+	CH_3Cl	CH_3	16.6 ± 0.05	RPD	330	2154
Cl^+	CH_3Cl	CH_3	18.6 ± 0.05	RPD		2154
Cl^+	CH_3Cl	CH_3	19.6 ± 0.05	RPD		2154
Cl^+	CH_3Cl	CH_3	20.1 ± 0.05	RPD		2154
Cl^+	C_2H_5Cl	$CH_3 + CH_2$?	23.4 ± 0.3	VC	386	356
Cl^+	$CH_3C{\equiv}CCl$	C_3H_3	18.4 ± 0.5	VC	(b)	13
Cl^+	$CHCl_3$	$CH + Cl_2$	22.0 ± 0.3	EVD	340	43
Cl^+	CNCl	CN^-	13.6 ± 0.1	SL		73
Cl^+	CNCl	CN	17.9 ± 0.1	SL	346	73
Cl^+	CF_3Cl	$CF_2 + F^-$?	21 ± 1	SL		24
Cl^+	ClO_3F	3O + F?	23.0 ± 0.2	SL	327	53
Cl^+	$POCl_3$		19 ± 1	NS		1101
Cl^+	CHF_2Cl	$CF_2 + H$?	20.5 ± 0.3	EVD	343	43
Cl^+	$CHFCl_2$	CFCl + H?	23.0 ± 0.3	EVD	361	43
Cl^+	TlCl	Tl	16.9 ± 0.1	RPD	330	2159

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$Cl_2^+(^2\Pi_{3/2g})$ Heat of formation 265 kcal mol^{-1}				
$Cl_2^+(^2\Pi_{3/2g})$	Cl_2		11.48 ± 0.01	PI	265*	182, 416
Cl_2^+	Cl_2		11.63 ± 0.04	RPD	268	292
$Cl_2^+(^2\Sigma_g^+)$	Cl_2		14.09 ± 0.03	RPD	325	292
$Cl_2^+(^2\Sigma_u^+)$	Cl_2		20.61 ± 0.06	RPD	475	292
Cl_2^+	Cl_2		12.03 ± 0.05	EVD	277	440
Cl_2^+	Cl_2		11.64 ± 0.05	SL	268	75
		Cl_2^{+2}				
Cl_2^{+2}	Cl_2		32.6	NS	752	75
		$HCl^+(^2\Pi_{3/2})$ Heat of formation 272 kcal mol^{-1} **$HCl^+(^2\Pi_{1/2})$ 274 kcal mol^{-1}**				
$HCl^+(^2\Pi_{3/2})$	HCl		12.74 ± 0.01	PI	272*	182, 416
$HCl^+(^2\Pi_{3/2})$	HCl		12.742 ± 0.010	PI	272*	1253
$HCl^+(^2\Pi_{1/2})$	HCl		12.818 ± 0.008	PI	274*	1253
HCl^+	HCl		12.56 ± 0.1	RPD	268	39
HCl^+	HCl		14.16 ± 0.2	RPD		39
		HCl^{+2}				
HCl^{+2}	HCl		35.5 ± 0.5	NRE	797	212
		$XeCl_4^+$				
$XeCl_4^+$	$XeCl_4$		11.5	TC		1164
		$LiCl^+$				
$LiCl^+$	LiCl		10.1	VC	186	2179
		Li_2Cl^+				
Li_2Cl^+	Li_2Cl_2	Cl	10.6	VC	72	2179
		BCl^+				
BCl^+	BCl_3	2Cl	18.54 ± 0.07	EVD	273	440
BCl^+	BCl_3	Cl_2	17.2 ± 0.2	VC	300	206
BCl^+	BCl_3	2Cl	20.0 ± 0.2	VC	307	206
		BCl_2^+				
BCl_2^+	BCl_3	Cl	13.01 ± 0.02	EVD	174	440
BCl_2^+	BCl_3	Cl	11.8 ± 0.2	VC	147	206
BCl_2^+	BCl_3	Cl	12.0 ± 0.2	VC	151	206
		BCl_2^{+2}				
BCl_2^{+2}	BCl_3	Cl	33.77 ± 0.07	EVD	653	440

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		BCl_3^+				
BCl_3^+	BCl_3		12.03 ± 0.02	EVD	181	440
BCl_3^+	BCl_3		10.6 ± 0.2	VC	148	206
BCl_3^+	BCl_3		10.9 ± 0.2	VC	155	206
BCl_3^+	BCl_3		11.0 ± 0.2	VC	157	206
		CCl^+				
CCl^+	CCl		12.9 ± 0.10	NS	420	129
CCl^+	CCl_2	Cl	16.3 ± 0.2	NS	413	319
CCl^+	CCl_4	$Cl_2 + Cl$	19.35 ± 0.05	NS	393	129
CCl^+	CCl_4	$Cl_2 + Cl$	19.4 ± 0.1	NS	394	319
CCl^+	$CHCl_3$	HCl + Cl	16.3 ± 0.2	EVD	344	43
CCl^+	CNCl	N	17.2 ± 0.2	SL	316	73
CCl^+	$CHFCl_2$	HCl + F	18.3 ± 0.2	EVD	356	43
		CCl_2^+				
CCl_2^+	CCl_2		13.10 ± 0.08	NS	368	129
CCl_2^+	CCl_2		13.2 ± 0.2	NS	370	319
CCl_2^+	CCl_4	Cl_2	16.10 ± 0.02	NS	347	129
CCl_2^+	CCl_4	Cl_2	16.5 ± 0.2	NS	356	319
		CCl_3^+ Heat of formation 214 kcal mol^{-1}				
CCl_3^+	CCl_3		8.78 ± 0.05	EVD	(a)	441
CCl_3^+	CCl_3		8.64	TC	213	136
CCl_3^+	CCl_4	Cl	11.65 ± 0.10	RPD	215*	196
CCl_3^+	CCl_4	Cl	11.67 ± 0.1	EVD	215*	441
CCl_3^+	CCl_4	Cl	11.90 ± 0.07	NS	221	129
CCl_3^+	$CHCl_3$	H	11.70 ± 0.09	RPD	193	1139
CCl_3^+	C_2HCl_5	$CHCl_2$	11.54 ± 0.1	SL		72
CCl_3^+	$CFCl_3$	F	12.77 ± 0.15	RPD	210*	185
CCl_3^+	$CFCl_3$	F	14.3 ± 0.2	RPD		185
CCl_3^+	$CFCl_3$	F	15.5 ± 0.2	RPD		185
CCl_3^+	CCl_3Br	Br	10.90 ± 0.1	EVD	214*	441
CCl_3^+	CCl_3COCHN_2		11.0	VC		2174
		CCl_4^+				
CCl_4^+	CCl_4		11.47 ± 0.01	PI	240*	182, 416
CCl_4^+	CCl_4		11.48	TC	240	1164
		$C_2Cl_4^+$				
$C_2Cl_4^+$	C_2Cl_4		9.32 ± 0.01	PI	212*	182, 168
$C_2Cl_4^+$	C_2Cl_4		9.71	TC	221	136
		ClO^+				
ClO^+	ClO_3F	2O + F	18.0 ± 0.5	SL	271	53
		ClO_2^+				
ClO_2^+	ClO_3F	O + F	15.7 ± 0.5	SL	278	53

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		ClO_3^+				
ClO_3^+	ClO_3F	F	14.3 ± 0.2	SL	305	53
		FCl^+				
FCl^+	F_3Cl		12.7 ± 0.3	VC		357
		F_2Cl^+				
F_2Cl^+	F_3Cl	F	12.8 ± 0.3	VC	237	357
		F_3Cl^+				
F_3Cl^+	F_3Cl		13.0 ± 0.2	VC	261	357
		$MgCl^+$				
$MgCl^+$	$MgCl_2$	Cl	11.5 ± 0.5	VC	140	178
		$MgCl_2^+$				
$MgCl_2^+$	$MgCl_2$		11.1 ± 0.2	VC	160	178
		$Mg_2Cl_3^+$				
$Mg_2Cl_3^+$	Mg_2Cl_4	Cl	11.2 ± 0.3	VC	−4	178
		$SiCl_3^+$ Heat of formation 101 kcal mol^{-1}				
$SiCl_3^+$	$SiCl_4$	Cl	12.48 ± 0.02	SL	102*	2182
$SiCl_3^+$	Si_2Cl_6	$SiCl_3$	11.55 ± 0.1	SL		2183
$SiCl_3^+$	$HSiCl_3$	H	11.91 ± 0.03	SL	100*	2182
$SiCl_3^+$	CH_3SiCl_3	CH_3	11.90 ± 0.08	SL	115	2182
$SiCl_3^+$	$C_2H_5SiCl_3$	C_2H_5	12.10 ± 0.03	SL	123	2182
$SiCl_3^+$	*iso*-$C_3H_7SiCl_3$	*iso*-C_3H_7	13.1 ± 0.2	SL	147	2182
$SiCl_3^+$	*tert*-$C_4H_9SiCl_3$	*tert*-C_4H_9	13.0 ± 0.1	SL		2182
		PCl^+				
PCl^+	PCl_3	2Cl	16.83 ± 0.3	EVD	261	192
PCl^+	PCl_3	2Cl	16.5 ± 0.5	NS	254	1101
PCl^+	P_2Cl_4	$PCl_2 + Cl$	15.7 ± 0.3	EVD		192
PCl^+	$POCl_3$	$O + Cl_2$?	17 ± 1	NS	199	1101
		P_2Cl^+				
P_2Cl^+	P_2Cl_4	$Cl_2 + Cl$	16.1 ± 0.4	EVD		192
		PCl_2^+				
PCl_2^+	PCl_3	Cl	12.32 ± 0.2	EVD	186	192
PCl_2^+	PCl_3	Cl^-	11.8 ± 0.5	NS	262	1101
PCl_2^+	P_2Cl_4	PCl_2	11.68 ± 0.2	EVD		192
PCl_2^+	$POCl_3$	$O + Cl^-$?	13.3 ± 0.5	NS	172	1101

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$P_2Cl_2^+$				
$P_2Cl_2^+$	P_2Cl_4	Cl_2	13.9 ± 0.3	EVD		192
		PCl_3^+ Heat of formation 160 kcal mol^{-1}				
PCl_3^+	PCl_3		9.91	PI	160*	1091
PCl_3^+	PCl_3		10.75 ± 0.2	EVD	179	192
PCl_3^+	PCl_3		10.6 ± 0.2	NS	176	1101
PCl_3^+	$POCl_3$		12.3 ± 0.5	NS		1101
		$P_2Cl_3^+$				
$P_2Cl_3^+$	P_2Cl_4	Cl	11.7 ± 0.3	EVD		192
		$P_2Cl_4^+$				
$P_2Cl_4^+$	P_2Cl_4		9.36 ± 0.2	EVD		192
		$CHCl^+$				
$CHCl^+$	$CHCl_3$	2Cl	17.5 ± 0.2	EVD	321	43
$CHCl^+$	$CHFCl_2$	Cl + F	19.0 ± 0.2	EVD	321	43
		CH_2Cl^+				
CH_2Cl^+	CH_2Cl		9.32	SL	244	141
CH_2Cl^+	CH_2Cl		9.70 ± 0.09	NS	253	131
CH_2Cl^+	CH_2Cl		9.42	TC	246	136
CH_2Cl^+	CH_3Cl	H−?	13.06	RPD	248	160
CH_2Cl^+	CH_3Cl	H−?	14.35	RPD		160
CH_2Cl^+	CH_3Cl	H	12.98 ± 0.07	RPD	228	1139
CH_2Cl^+	CH_3Cl	H	13.64	RPD	243	160
CH_2Cl^+	CH_3Cl	H	14.95	RPD		160
CH_2Cl^+	CH_3Cl	H	12.88 ± 0.1	SL	226	72
CH_2Cl^+	CH_3Cl	H	13.0 ± 0.2	VC	228	356
CH_2Cl^+	C_2H_5Cl	CH_3	13.20 ± 0.2	SL	244	72
CH_2Cl^+	C_2H_5Cl	CH_3	13.6 ± 0.2	VC	254	356
CH_2Cl^+	CH_2Cl_2	Cl	12.12 ± 0.1	SL	228	72
CH_2Cl^+	CH_2Cl_2	Cl	12.89 ± 0.03	NS	246	131
CH_2Cl^+	CH_2ClCH_2Cl	CH_2Cl	12.52 ± 0.1	SL	229	72
CH_2Cl^+	CH_3COCH_2Cl	$COCH_3$	13.8 ± 0.07	VC	266	2174
CH_2Cl^+ (Epichlorohydrin)	C_3H_5OCl	C_2H_3O	12.5 ± 0.1	EVD	266	153
CH_2Cl^+	CH_2ClBr	Br	11.56 ± 0.1	SL	228	72
CH_2Cl^+	$CH_2ClCOCHN_2$	$COCHN_2$	12.2 ± 0.1	VC		2174
		CH_3Cl^+ ($^2E_{1/2}$) Heat of formation 239 kcal mol^{-1}				
		CH_3Cl^+ ($^2E_{3/2}$) 241 kcal mol^{-1}				
CH_3Cl^+ ($^2E_{1/2}$)	CH_3Cl		11.220	S	239*	2064
CH_3Cl^+ ($^2E_{1/2}$)	CH_3Cl		11.265 ± 0.003	PI	240*	1253
CH_3Cl^+ ($^2E_{3/2}$)	CH_3Cl		11.305	S	241*	2064
CH_3Cl^+ ($^2E_{3/2}$)	CH_3Cl		11.340 ± 0.003	PI	242*	1253
CH_3Cl^+	CH_3Cl		11.28 ± 0.01	PI	241	182, 416
CH_3Cl^+	CH_3Cl		11.28	PI	241	1399

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$CH_3Cl^+(^2E_{3/2})$	CH_3Cl		11.4 ± 0.05	RPD	244	2154
CH_3Cl^+	CH_3Cl		11.42 ± 0.02	RPD	244	289
CH_3Cl^+	CH_3Cl		11.9 ± 0.05	RPD		2154
CH_3Cl^+	CH_3Cl		12.07 ± 0.04	RPD		289
CH_3Cl^+	CH_3Cl		13.02 ± 0.04	RPD		289
CH_3Cl^+	CH_3Cl		13.2 ± 0.05	RPD		2154
CH_3Cl^+	CH_3Cl		18.71 ± 0.06	RPD		289
CH_3Cl^+	CH_3Cl		10.9 ± 0.3	SL	232	364
CH_3Cl^+	CH_3Cl		11.3 ± 0.1	SL	241	364
CH_3Cl^+	CH_3Cl		11.44 ± 0.02	SL	244	2146
CH_3Cl^+	CH_3Cl		11.45 ± 0.05	SL	245	72
CH_3Cl^+	CH_3Cl		11.33	TC	242	136
		C_2HCl^+				
C_2HCl^+	*cis*-$C_2H_2Cl_2$	HCl	13.27 ± 0.05	SL	329	114
C_2HCl^+	*trans*-$C_2H_2Cl_2$	HCl	13.39 ± 0.05	SL	332	114
		$C_2H_2Cl^+$				
$C_2H_2Cl^+$	*cis*-$C_2H_2Cl_2$	Cl	12.29 ± 0.05	SL	255	114
$C_2H_2Cl^+$	*trans*-$C_2H_2Cl_2$	Cl	12.61 ± 0.05	SL	263	114
		$C_2H_3Cl^+$ Heat of formation 239 kcal mol^{-1}				
$C_2H_3Cl^+$	C_2H_3Cl		9.998	S	239*	261
$C_2H_3Cl^+$	C_2H_3Cl		9.995 ± 0.01	PI	239*	182
$C_2H_3Cl^+$	C_2H_3Cl		9.995	PI	239*	168
$C_2H_3Cl^+$	C_2H_3Cl		10.00 ± 0.02	PI	239*	268
$C_2H_3Cl^+$	C_2H_3Cl		10.515	PI		268
$C_2H_3Cl^+$	C_2H_3Cl		10.10 ± 0.03	EVD	242	268
$C_2H_3Cl^+$	C_2H_3Cl		10.39	TC	248	136
		$C_2D_3Cl^+$				
$C_2D_3Cl^+$	C_2D_3Cl		10.02 ± 0.02	PI		268
$C_2D_3Cl^+$	C_2D_3Cl		10.10 ± 0.03	EVD		268
		$C_2H_5Cl^+(^2E_{1/2})$ Heat of formation 226 kcal mol^{-1}				
$C_2H_5Cl^+(^2E_{1/2})$	C_2H_5Cl		10.97 ± 0.02	PI	226*	416
$C_2H_5Cl^+(^2E_{1/2})$	C_2H_5Cl		10.98 ± 0.02	PI	226*	182
$C_2H_5Cl^+(^2E_{1/2})$	C_2H_5Cl		11.1	RPD	229	160
$C_2H_5Cl^+$	C_2H_5Cl		11.5	RPD		160
$C_2H_5Cl^+$	C_2H_5Cl		12.5	RPD		160
$C_2H_5Cl^+$	C_2H_5Cl		13.2	RPD		160
$C_2H_5Cl^+$	C_2H_5Cl		11.10 ± 0.06	SL	229	2146
$C_2H_5Cl^+$	C_2H_5Cl		11.16 ± 0.05	SL	231	72
$C_2H_5Cl^+$	C_2H_5Cl		11.2 ± 0.2	VC	231	356
$C_2H_5Cl^+$	C_2H_5Cl		11.5	TC		2038
$C_2H_5Cl^+$	C_2H_5Cl		12.3	TC		2038
$C_2H_5Cl^+$	C_2H_5Cl		13.2	TC		2038
		$C_3H_3Cl^+$				
$C_3H_3Cl^+$	$CH_3C{\equiv}CCl$		9.9 ± 0.1	VC	265*	13
		$C_3H_4Cl^+$				
$C_3H_4Cl^+$	$CHCl{=}CHCH_2$		8.06	TC	209	136
$C_3H_4Cl^+$	$CH_2{=}CClCH_2$		8.16	TC	210	136

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		n-$C_3H_7Cl^+$ Heat of formation 218 kcal mol^{-1}				
		iso-$C_3H_7Cl^+$ 212 kcal mol^{-1}				
$C_3H_7Cl^+$	n-C_3H_7Cl		10.82 ± 0.03	PI	218*	182
$C_3H_7Cl^+$	n-C_3H_7Cl		10.78 ± 0.04	SL	218	2146
$C_3H_7Cl^+$	n-C_3H_7Cl		11.05 ± 0.05	SL	224	72
$C_3H_7Cl^+$	n-C_3H_7Cl		11.0	TC		2038
$C_3H_7Cl^+$	n-C_3H_7Cl		12.0	TC		2038
$C_3H_7Cl^+$	n-C_3H_7Cl		12.4	TC		2038
$C_3H_7Cl^+$	n-C_3H_7Cl		13.2	TC		2038
$C_3H_7Cl^+$	iso-C_3H_7Cl		10.78 ± 0.02	PI	212*	182
$C_3H_7Cl^+$	iso-C_3H_7Cl		11.2	RPD		160
$C_3H_7Cl^+$	iso-C_3H_7Cl		11.6	RPD		160
$C_3H_7Cl^+$	iso-C_3H_7Cl		12.5	RPD		160
$C_3H_7Cl^+$	iso-C_3H_7Cl		13.1	RPD		160
$C_3H_7Cl^+$	iso-C_3H_7Cl		10.77 ± 0.03	SL	212	2146
$C_3H_7Cl^+$	iso-C_3H_7Cl		11.0	TC		2038
$C_3H_7Cl^+$	iso-C_3H_7Cl		11.7	TC		2038
$C_3H_7Cl^+$	iso-C_3H_7Cl		12.7	TC		2038
$C_3H_7Cl^+$	iso-C_3H_7Cl		13.2	TC		2038
		n-$C_4H_9Cl^+$ Heat of formation 211 kcal mol^{-1}				
		sec-$C_4H_9Cl^+$ 207 kcal mol^{-1}				
		iso-$C_4H_9Cl^+$ 208 kcal mol^{-1}				
		$tert$-$C_4H_9Cl^+$ 202 kcal mol^{-1}				
$C_4H_9Cl^+$	n-C_4H_9Cl		10.67 ± 0.03	PI	211*	182
$C_4H_9Cl^+$	n-C_4H_9Cl		10.50 ± 0.07	SL	207	2146
$C_4H_9Cl^+$	sec-C_4H_9Cl		10.65 ± 0.03	PI	207*	182
$C_4H_9Cl^+$	sec-C_4H_9Cl		10.52 ± 0.1	SL	204	2146
$C_4H_9Cl^+$	iso-C_4H_9Cl		10.66 ± 0.03	PI	208*	182
$C_4H_9Cl^+$	iso-C_4H_9Cl		10.48 ± 0.1	SL	203	2146
$C_4H_9Cl^+$	$tert$-C_4H_9Cl		10.61 ± 0.03	PI	202*	182
$C_4H_9Cl^+$	$tert$-C_4H_9Cl		10.3 ± 0.1	SL	194	2146
		$C_5H_4Cl^+$				
$C_5H_4Cl^+$ (Chlorocyclopentadienyl radical)	C_5H_4Cl		8.78	SL		126
		$cyclo$-$C_6H_5Cl^+$ Heat of formation 222 kcal mol^{-1}				
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.07 ± 0.02	PI	222*	182, 416
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.07	PI	222*	168
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.35	PE		2015
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.68	PE		2015
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		11.44	PE		2015
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		11.79	PE		2015
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		12.38	PE		2015
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		17.02	PE		2015

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.60	SL	234	1066
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.6 ± 0.1	SL	234	301
$C_6H_5Cl^+$ (Chlorobenzene)	C_6H_5Cl		9.14	TC	224	136
		$C_7H_6Cl^+$				
$C_7H_6Cl^+$ (*p*-Chlorobenzyl radical)	$C_6H_4ClCH_2$		7.95 ± 0.1	SL	213*	69
		$C_7H_7Cl^+$				
$C_7H_7Cl^+$ (Benzyl chloride)	$C_6H_5CH_2Cl$		9.19 ± 0.05	CS	219*	2025
$C_7H_7Cl^+$ (*o*-Chlorotoluene)	$C_6H_4ClCH_3$		8.83 ± 0.02	PI	208*	182
$C_7H_7Cl^+$ (*o*-Chlorotoluene)	$C_6H_4ClCH_3$		8.92	TC	210	136
$C_7H_7Cl^+$ (*m*-Chlorotoluene)	$C_6H_4ClCH_3$		8.83 ± 0.02	PI	207*	182
$C_7H_7Cl^+$ (*m*-Chlorotoluene)	$C_6H_4ClCH_3$		9.10 ± 0.05	CS	213	2025
$C_7H_7Cl^+$ (*m*-Chlorotoluene)	$C_6H_4ClCH_3$		8.93	TC	209	136
$C_7H_7Cl^+$ (*p*-Chlorotoluene)	$C_6H_4ClCH_3$		8.69 ± 0.02	PI	204*	416, 182
$C_7H_7Cl^+$ (*p*-Chlorotoluene)	$C_6H_4ClCH_3$		9.21	SL	216	1066
$C_7H_7Cl^+$ (*p*-Chlorotoluene)	$C_6H_4ClCH_3$		8.95	TC	210	136
$C_7H_7Cl^+$ (Chlorotoluene)	$C_6H_4ClCH_3$		9.24	TC	217	2194
		$C_7H_9Cl^+$				
$C_7H_9Cl^+$ (*endo*-5-Chloro-2-norbornene)	C_7H_9Cl		9.1 ± 0.15	SL	233*	2155
$C_7H_9Cl^+$ (*exo*-5-Chloro-2-norbornene)	C_7H_9Cl		9.15 ± 0.15	SL	234*	2155
$C_7H_9Cl^+$ (3-Chloronortricyclene)	C_7H_9Cl		9.51 ± 0.15	SL	234*	2155
		$CHCl_2^+$				
$CHCl_2^+$	$CHCl_2$		9.30	SL	245	141
$CHCl_2^+$	$CHCl_2$		9.54 ± 0.10	NS	251	131
$CHCl_2^+$	$CHCl_2$		9.02	TC	239	136
$CHCl_2^+$	CH_2Cl_2	H	12.12 ± 0.05	RPD	205	1139
$CHCl_2^+$	CH_2Cl_2	H	13.00 ± 0.10	NS	226	131
$CHCl_2^+$	$CHCl_3$	Cl	11.64 ± 0.20	EVD	215	43
$CHCl_2^+$	$CHCl_3$	Cl	11.70 ± 0.1	SL	216	72
$CHCl_2^+$	$CHCl_3$	Cl	12.43 ± 0.02	NS	233	131
$CHCl_2^+$	$CHCl_2CHCl_2$	$CHCl_2$	11.55 ± 0.1	SL	200	72
$CHCl_2^+$	$CHCl_2Br$	Br	11.02 ± 0.1	SL	213	72

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CH_2Cl_2^+$				
$CH_2Cl_2^+$	CH_2Cl_2		11.35 ± 0.02	PI	240*	182, 416
$CH_2Cl_2^+$	CH_2Cl_2		11.49 ± 0.05	SL	243	72
$CH_2Cl_2^+$	CH_2Cl_2		11.60	TC	245	1164
		***cis*-$C_2H_2Cl_2^+$ Heat of formation 223 kcal mol^{-1}**				
		***trans*-$C_2H_2Cl_2^+$ 224 kcal mol^{-1}**				
$C_2H_2Cl_2^+$	$CH_2{=}CCl_2$		9.459	S	218	269
$C_2H_2Cl_2^+$	$CH_2{=}CCl_2$		9.79	PI	225*	168
$C_2H_2Cl_2^+$	$CH_2{=}CCl_2$		10.16	TC	234	136
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.652	S	223	261
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.65 ± 0.01	PI	223*	182
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.65	PI	223*	168
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.66 ± 0.02	PI	224*	114, 268, 1058, 1190
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.66 ± 0.05	EVD	224	268
$C_2H_2Cl_2^+$	*cis*-$C_2H_2Cl_2$		9.67 ± 0.05	SL	224	114, 1190, 1058
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		9.954	S	231	261
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		9.63	PI	224*	168
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		9.64 ± 0.02	PI	224*	114, 268, 1058, 1190
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		9.66 ± 0.03	PI	224*	182
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		9.96 ± 0.05	EVD	231	268
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		10.00 ± 0.05	SL	232	114, 1190
$C_2H_2Cl_2^+$	*trans*-$C_2H_2Cl_2$		10.00 ± 0.05	NS	232	1058
$C_2H_2Cl_2^+$	CHCl=CHCl		10.275	PI		268
$C_2H_2Cl_2^+$	CHCl=CHCl		10.50	PI		268
$C_2H_2Cl_2^+$	CHCl=CHCl		10.74	PI		268
$C_2H_2Cl_2^+$	CHCl=CHCl		10.14	TC		136
		$C_2H_4Cl_2^+$				
$C_2H_4Cl_2^+$	CH_2ClCH_2Cl		11.12 ± 0.05	PI	225*	182
$C_2H_4Cl_2^+$	CH_2ClCH_2Cl		11.25 ± 0.05	SL	228	72
		$C_3H_4Cl_2^+$				
$C_3H_4Cl_2^+$	$CH_2{=}CClCH_2Cl$		9.82 ± 0.03	PI	218*	182
		$C_3H_6Cl_2^+$				
$C_3H_6Cl_2^+$	1,2-$C_3H_6Cl_2$		10.87 ± 0.05	PI	215*	182
$C_3H_6Cl_2^+$	1,3-$C_3H_6Cl_2$		10.85 ± 0.05	PI	215*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		***o*-$C_6H_4Cl_2^+$ Heat of formation 217 kcal mol^{-1}**				
		***m*-$C_6H_4Cl_2^+$ 217 kcal mol^{-1}**				
		***p*-$C_6H_4Cl_2^+$ 212 kcal mol^{-1}**				
$C_6H_4Cl_2^+$ (*o*-Dichlorobenzene)	$C_6H_4Cl_2$		9.06	PI	217*	168
$C_6H_4Cl_2^+$ (*o*-Dichlorobenzene)	$C_6H_4Cl_2$		9.07 ± 0.01	PI	217*	182
$C_6H_4Cl_2^+$ (*o*-Dichlorobenzene)	$C_6H_4Cl_2$		9.64	SL	230	1066
$C_6H_4Cl_2^+$ (*o*-Dichlorobenzene)	$C_6D_4Cl_2$		9.06	TC	217	136
$C_6H_4Cl_2^+$ (*m*-Dichlorobenzene)	$C_6H_4Cl_2$		9.12 ± 0.01	PI	217*	182
$C_6H_4Cl_2^+$ (*p*-Dichlorobenzene)	$C_6H_4Cl_2$		8.94 ± 0.01	PI	212*	182
$C_6H_4Cl_2^+$ (*p*-Dichlorobenzene)	$C_6H_4Cl_2$		8.95	PI	212*	168
$C_6H_4Cl_2^+$ (*p*-Dichlorobenzene)	$C_6H_4Cl_2$		9.07	TC	215	136
		$CHCl_3^+$				
$CHCl_3^+$	$CHCl_3$		11.42 ± 0.03	PI	239*	182, 416
$CHCl_3^+$	$CHCl_3$		11.39 ± 0.12	EVD	238	43
		$C_2HCl_3^+$ Heat of formation 216 kcal mol^{-1}				
$C_2HCl_3^+$	C_2HCl_3		8.79	S	201	261
$C_2HCl_3^+$	C_2HCl_3		9.45 ± 0.01	PI	216*	182
$C_2HCl_3^+$	C_2HCl_3		9.45	PI	216*	168
$C_2HCl_3^+$	C_2HCl_3		9.47 ± 0.01	PI	217*	416
$C_2HCl_3^+$	C_2HCl_3		9.94	TC	227	136
		$C_2H_2Cl_4^+$				
$C_2H_2Cl_4^+$	$CHCl_2CHCl_2$		11.10 ± 0.05	SL	220*	72
		$CNCl^+$				
$CNCl^+$	CNCl		12.49 ± 0.04	SL	321*	73
		$CFCl^+$				
$CFCl^+$	$CFCl_3$	Cl_2	17.41 ± 0.15	RPD	336	185
$CFCl^+$	$CFCl_3$	2Cl?	18.8 ± 0.2	RPD	309	185
$CFCl^+$	CHF_2Cl	H + F^-?	15.9 ± 0.3	EVD		43
		CF_2Cl^+				
CF_2Cl^+	CF_3Cl	F	15.0 ± 0.4	SL	161	24
		CF_3Cl^+				
CF_3Cl^+	CF_3Cl		12.91 ± 0.03	PI	132*	182
CF_3Cl^+	CF_3Cl		12.8 ± 0.2	EVD	129	439
CF_3Cl^+	CF_3Cl		13 ± 1	SL	134	24

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2F_3Cl^+$				
$C_2F_3Cl^+$	C_2F_3Cl		10.4 ± 0.2	SL	107*	214
		$C_3F_5Cl^+$				
$C_3F_5Cl^+$	$CF_2ClCF{=}CF_2$		10.79	VC		1290
		$C_6F_5Cl^+$				
$C_6F_5Cl^+$ (Chloropentafluorobenzene)	C_6F_5Cl		10.4 ± 0.1	SL		301
		$CFCl_2^+$				
$CFCl_2^+$	$CFCl_3$	Cl	11.97 ± 0.07	RPD	181	185
		$CF_2Cl_2^+$				
$CF_2Cl_2^+$	CF_2Cl_2		12.31 ± 0.05	PI	170*	182
$CF_2Cl_2^+$	CF_2Cl_2		11.95	TC	162	1164
		$C_2F_2Cl_2^+$				
$C_2F_2Cl_2^+$	$C_2F_2Cl_2$		10.0 ± 0.2	SL		214
		$C_4F_6Cl_2^+$				
$C_4F_6Cl_2^+$	$CF_3CCl{=}CClCF_3$		10.36 ± 0.01	PI		182
		$CFCl_3^+$				
$CFCl_3^+$	$CFCl_3$		11.77 ± 0.02	PI	205*	182
		$C_2F_3Cl_3^+$				
$C_2F_3Cl_3^+$	CF_3CCl_3		11.78 ± 0.03	PI		182
$C_2F_3Cl_3^+$	$CFCl_2CF_2Cl$		11.99 ± 0.02	PI	95*	182
		ClO_3F^+				
ClO_3F^+	ClO_3F		13.6 ± 0.2	SL	308*	53
		$POCl_2^+$				
$POCl_2^+$	$POCl_3$	Cl^-	13.3 ± 0.2	NS	232	1101
		$POCl_3^+$				
$POCl_3^+$	$POCl_3$		13.1 ± 0.2	NS	169	1101
		$C_5H_4NCl^+$				
$C_5H_4NCl^+$ (2-Chloropyridine)	C_5H_4NCl		9.91 ± 0.05	SL	255*	217
$C_5H_4NCl^+$ (4-Chloropyridine)	C_5H_4NCl		10.15 ± 0.05	SL	260*	217

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_{10}NCl^+$				
$C_8H_{10}NCl^+$	$C_6H_4ClN(CH_3)_2$ (*N*,*N*-Dimethyl-*p*-chloroaniline)		7.38	CTS	182	1281
		$C_2H_2OCl^+$				
$C_2H_2OCl^+$	CH_3COCH_2Cl	CH_3	11.97 ± 0.11	VC	186	2174
$C_2H_2OCl^+$	$CH_2ClCOCHN_2$	CHN_2	11.66 ± 0.04	VC		2174
		$C_2H_3OCl^+$				
$C_2H_3OCl^+$	CH_3COCl		11.02 ± 0.05	PI	196*	182
$C_2H_3OCl^+$	CH_3COCl		11.08 ± 0.06	CS	197	2026
		$C_3H_5OCl^+$ Heat of formation 173 kcal mol^{-1}				
$C_3H_5OCl^+$	CH_3COCH_2Cl		9.98 ± 0.13	VC	173*	2174
$C_3H_5OCl^+$	CH_3COCH_2Cl		10.00 ± 0.01	CS	174*	2026
		$C_6H_5OCl^+$				
$C_6H_5OCl^+$	C_6H_4ClOH (*o*-Chlorophenol)		9.28	SL	181*	1066
$C_6H_5OCl^+$	C_6H_4ClOH (*p*-Chlorophenol)		9.07	SL	175*	1066
$C_6H_5OCl^+$	C_6H_4ClOH (Chlorophenol)		9.19	TC	178	2194
		$C_7H_5OCl^+$				
$C_7H_5OCl^+$	C_6H_5COCl (Benzoyl chloride)		10.6	SL	216	308
$C_7H_5OCl^+$	C_6H_5COCl (Benzoyl chloride)		9.70 ± 0.01	CS	195*	2026
$C_7H_5OCl^+$	C_6H_4ClCHO (*p*-Chlorobenzaldehyde)		9.61 ± 0.01	CS	201*	2026
$C_7H_5OCl^+$	C_6H_4ClCHO (Chlorobenzaldehyde)		9.83	TC	206	2194
		$C_8H_7OCl^+$ (*α*-Chloroacetophenone) Heat of formation 195 kcal mol^{-1}				
		$C_8H_7OCl^+$ (*p*-Chloroacetophenone) 190 kcal mol^{-1}				
		$C_8H_7OCl^+$ (*p*-Methylbenzoyl chloride) 187 kcal mol^{-1}				
$C_8H_7OCl^+$	$C_6H_5COCH_2Cl$ (*α*-Chloroacetophenone)		9.44 ± 0.05	CS	193*	2025
$C_8H_7OCl^+$	$C_6H_5COCH_2Cl$ (*α*-Chloroacetophenone)		9.65 ± 0.01	CS	198*	2026
$C_8H_7OCl^+$	$C_6H_4ClCOCH_3$ (*p*-Chloroacetophenone)		9.47 ± 0.05	CS	190*	2026
$C_8H_7OCl^+$	$C_6H_4ClCOCH_3$ (Chloroacetophenone)		9.51	TC	191	2194
$C_8H_7OCl^+$	$C_6H_4CH_3COCl$ (*p*-Methylbenzoyl chloride)		9.37 ± 0.01	CS	187*	2026
		$C_{13}H_9OCl^+$				
$C_{13}H_9OCl^+$	$C_6H_4ClCOC_6H_5$ (*p*-Chlorobenzophenone)		9.68 ± 0.01	CS	227*	2026
$C_{13}H_9OCl^+$	$C_6H_4ClCOC_6H_5$ (Chlorobenzophenone)		9.56	TC	224	2194

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_4O_2Cl^+$				
$C_2H_4O_2Cl^+$	$CH_2ClCOOC_2H_5$	C_2H_3	10.97	VC	78	1059
		$C_3H_5O_2Cl^+$				
$C_3H_5O_2Cl^+$	$CH_2ClCOOCH_3$		10.53 ± 0.05	CS	138*	2025
		$C_8H_7O_2Cl^+$				
$C_8H_7O_2Cl^+$ (*p*-Methoxybenzoyl chloride)	$C_6H_4CH_3OCOCl$		8.87 ± 0.05	CS	149*	2026
$C_8H_7O_2Cl^+$ (Methyl chlorobenzoate)	$C_6H_4ClCOOCH_3$		9.70	TC	147	2194
		$C_7H_4OCl_2^+$				
$C_7H_4OCl_2^+$ (*p*-Chlorobenzoyl chloride)	$C_6H_4ClCOCl$		9.58 ± 0.03	CS	192*	2026
		$CHFCl^+$				
$CHFCl^+$	CHF_2Cl	F	15.11 ± 0.15	EVD	217	43
$CHFCl^+$	$CHFCl_2$	Cl	12.69 ± 0.15	EVD	195	43
		***cis*-$C_2H_2FCl^+$ Heat of formation 191 kcal mol^{-1}**				
		***trans*-$C_2H_2FCl^+$ 191 kcal mol^{-1}**				
$C_2H_2FCl^+$	*cis*-C_2H_2FCl		9.86 ± 0.02	PI	191*	268
$C_2H_2FCl^+$	*cis*-C_2H_2FCl		9.87 ± 0.01	PI	192*	182
$C_2H_2FCl^+$	*cis*-C_2H_2FCl		10.14 ± 0.03	EVD	198	268
$C_2H_2FCl^+$	*trans*-C_2H_2FCl		9.87 ± 0.01	PI	191*	182
$C_2H_2FCl^+$	*trans*-C_2H_2FCl		9.87 ± 0.02	PI	191*	268
$C_2H_2FCl^+$	*trans*-C_2H_2FCl		10.30 ± 0.03	EVD	201	268
$C_2H_2FCl^+$	CHF=CHCl		10.30	PI		268
		$C_6H_4FCl^+$				
$C_6H_4FCl^+$ (*o*-Chlorofluorobenzene)	C_6H_4FCl		9.155 ± 0.01	PI	180*	182
$C_6H_4FCl^+$ (*o*-Chlorofluorobenzene)	C_6H_4FCl		9.46 ± 0.02	EVD	187	1185
$C_6H_4FCl^+$ (*m*-Chlorofluorobenzene)	C_6H_4FCl		9.21 ± 0.01	PI	180*	182
$C_6H_4FCl^+$ (*m*-Chlorofluorobenzene)	C_6H_4FCl		9.55 ± 0.02	EVD	188	1185
$C_6H_4FCl^+$ (*p*-Chlorofluorobenzene)	C_6H_4FCl		9.43 ± 0.02	EVD	185	1185
		CHF_2Cl^+				
CHF_2Cl^+	CHF_2Cl		12.45 ± 0.05	PI	174*	182
CHF_2Cl^+	CHF_2Cl		12.69 ± 0.15	EVD	180	43
		$C_2HF_2Cl^+$ Heat of formation 147 kcal mol^{-1}				
$C_2HF_2Cl^+$	*cis*-C_2HF_2Cl		9.86 ± 0.02	PI	147*	268
$C_2HF_2Cl^+$	*cis*-C_2HF_2Cl		10.17 ± 0.03	EVD	155	268
$C_2HF_2Cl^+$	*trans*-C_2HF_2Cl		9.83 ± 0.02	PI	147*	268
$C_2HF_2Cl^+$	*trans*-C_2HF_2Cl		9.96 ± 0.03	EVD	150	268
$C_2HF_2Cl^+$	CHF=CFCl		10.43	PI		268
$C_2HF_2Cl^+$	CHF=CFCl		10.82	PI		268

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_3F_2Cl^+$				
$C_2H_3F_2Cl^+$	CH_3CF_2Cl		11.98 ± 0.01	PI		182
		$C_4H_2F_7Cl^+$				
$C_4H_2F_7Cl^+$	n-$C_3F_7CH_2Cl$		11.84 ± 0.02	PI		182
		$CHFCl_2^+$				
$CHFCl_2^+$	$CHFCl_2$		12.39 ± 0.20	EVD	217*	43
		$C_2H_6SiCl^+$				
$C_2H_6SiCl^+$	$(CH_3)_3SiCl$	CH_3	11.00 ± 0.16	RPD	136	1421
		$C_3H_9SiCl^+$				
$C_3H_9SiCl^+$	$(CH_3)_3SiCl$		10.58 ± 0.04	RPD	160*	1421
		$CH_3SiCl_3^+$				
$CH_3SiCl_3^+$	CH_3SiCl_3		11.36 ± 0.03	SL	136*	2182
		$C_2H_3SiCl_3^+$				
$C_2H_3SiCl_3^+$	$CH_2{=}CHSiCl_3$		10.79 ± 0.02	PI	148*	182
		$C_2H_5SiCl_3^+$				
$C_2H_5SiCl_3^+$	$C_2H_5SiCl_3$		10.74 ± 0.04	SL	117*	2182
		$C_3H_7SiCl_3^+$				
$C_3H_7SiCl_3^+$	*iso*-$C_3H_7SiCl_3$		10.28 ± 0.1	SL	99*	2182
		$C_4H_3ClS^+$				
$C_4H_3ClS^+$ (2-Chlorothiophene)	C_4H_3ClS		8.68 ± 0.01	PI	217*	182, 416
		$C_3H_3N_2OCl^+$				
$C_3H_3N_2OCl^+$	$CH_2ClCOCHN_2$		9.92 ± 0.1	VC		2174
		$C_7H_4NO_3Cl^+$				
$C_7H_4NO_3Cl^+$ (*p*-Nitrobenzoyl chloride)	$C_6H_4NO_2COCl$		10.66 ± 0.01	CS	219*	2026
		$C_3HN_2OCl_3^+$				
$C_3HN_2OCl_3^+$	CCl_3COCHN_2		9.95 ± 0.06	VC		2174
		K^+ Heat of formation 121 kcal mol^{-1}				
K^+	K		4.341	S	121*	2113
K^+	KI	I	8.6 ± 0.3	VC		2001

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
Ca^+ Heat of formation 187 kcal mol^{-1}						
Ca^+	Ca		6.113	S	187*	2113
Ca^+	Ca		6.0±0.5	VC	184	1297
Ca^+	Ca		5.9±0.2	VC	182	2141
Ca^+	Ca		6.1±0.2	NS	187	2178
Ca^{+2} Heat of formation 461 kcal mol^{-1}						
Ca^{+2}	Ca		17.98	S	461*	2113
Ca^{+2}	Ca		28.5±2	NS	703	2178
CaO^+						
CaO^+	CaO		6.5	LE	163	1244
CaO^+	CaO		6.5	LE	163	2123
CaF^+ Heat of formation 75 kcal mol^{-1}						
CaF^+	CaF		6.0±0.5	VC	74*	2141, 1297
CaF^+	CaF		5.5±0.3	VC	63*	2165
CaF^+	CaF		5.8±0.3	VC	70*	2165
CaF^+	CaF_2	F	12.5±0.8	VC	81*	2141, 1297
CaF^+	CaF_2	F	12.5	VC	81*	2165
Sc^+ Heat of formation 242 kcal mol^{-1}						
Sc^+	Sc		6.561	S	242*	2113
Sc^+	ScF_3	3F?	28.0	VC	310	2009
ScF^+						
ScF^+	ScF_3	2F?	16.0	VC	52	2009
ScF_2^+						
ScF_2^+	ScF_3	F?	13.5	VC	13	2009
V^+ Heat of formation 275 kcal mol^{-1}						
V^+	V		6.740	S	275*	2113
V^+	$C_5H_5V(CO)_4$ (Cyclopentadienylvanadium tetracarbonyl)		19.4±0.4	EVD		1381
$C_3H_3V^+$						
$C_3H_3V^+$	$C_5H_5V(CO)_4$ (Cyclopentadienylvanadium tetracarbonyl)	C_2H_2+4CO?	18.9±0.3	EVD	307	1381
$C_5H_5V^+$						
$C_5H_5V^+$	$C_5H_5V(CO)_4$ (Cyclopentadienylvanadium tetracarbonyl)	4CO	14.2±0.2	EVD	253	1381
$C_6H_5OV^+$						
$C_6H_5OV^+$	$C_5H_5V(CO)_4$ (Cyclopentadienylvanadium tetracarbonyl)	3CO	10.7±0.3	EVD	146	1381

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_7H_5O_2V^+$				
$C_7H_5O_2V^+$	$C_5H_5V(CO)_4$	2CO	9.7 ± 0.3	EVD	97	1381
(Cyclopentadienylvanadium tetracarbonyl)						
		$C_9H_5O_4V^+$				
$C_9H_5O_4V^+$	$C_5H_5V(CO)_4$		8.2 ± 0.3	EVD	9*	1381
(Cyclopentadienylvanadium tetracarbonyl)						
		Cr^+ Heat of formation 251 kcal mol^{-1}				
Cr^+	Cr		6.765	S	251*	2113
Cr^+	Cr		6.7 ± 0.3	VC	249	1249
Cr^+	$Cr(CO)_6$	6CO	17.7 ± 0.3	EVD	326	1107
Cr^+	$Cr(CO)_6$	6CO	14.7 ± 0.1	CS	257	2023
Cr^+	CrO_2F_2		30.8 ± 0.2	LE		30
Cr^+	CrO_2Cl_2		26.7 ± 0.2	LE		30
		CrO^+				
CrO^+	CrO		8.4 ± 0.5	LE	247	2130
CrO^+	CrO_2	O	13.5	LE	239	2130
CrO^+	CrO_2F_2	O + 2F?	24.4 ± 0.2	LE		30
CrO^+	CrO_2Cl_2	O + 2Cl?	21.4 ± 0.2	LE	247	30
		CrO_2^+				
CrO_2^+	CrO_2		10.3 ± 0.5	LE	225	2130
CrO_2^+	CrO_2F_2	F_2	19.8 ± 0.2	LE		30
CrO_2^+	CrO_2Cl_2	Cl_2	15.2 ± 0.5	LE	222	30
		CrO_3^+				
CrO_3^+	CrO_3		11.6 ± 0.5	LE	200	2130
		CrF^+				
CrF^+	CrF		8.4 ± 0.3	VC	201	1249
CrF^+	CrO_2F_2	2O + F?	21.7 ± 0.4	LE		30
		CrF_2^+				
CrF_2^+	CrF_2		10.1 ± 0.3	VC	134	1249
CrF_2^+	CrO_2F_2	2O?	14.8 ± 0.2	LE		30
		$CrCl^+$				
$CrCl^+$	CrO_2Cl_2	2O + Cl?	22.2 ± 0.2	LE	235	30
		$CrCl_2^+$				
$CrCl_2^+$	CrO_2Cl_2	2O?	18.2 ± 0.2	LE	172	30
		$CrCO^+$				
$CrCO^+$	$Cr(CO)_6$	5CO	14.9 ± 0.2	EVD	235	1107
$CrCO^+$	$Cr(CO)_6$	5CO	13.3 ± 0.2	CS	198	2023

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CrC_2O_2^+$				
$CrC_2O_2^+$	$Cr(CO)_6$	4CO	13.1 ± 0.2	EVD	167	1107
$CrC_2O_2^+$	$Cr(CO)_6$	4CO	11.56 ± 0.2	CS	132	2023
		$CrC_3O_3^+$				
$CrC_3O_3^+$	$Cr(CO)_6$	3CO	10.62 ± 0.15	CS	84	2023
		$CrC_4O_4^+$				
$CrC_4O_4^+$	$Cr(CO)_6$	2CO	9.97 ± 0.04	CS	42	2023
		$CrC_5O_5^+$				
$CrC_5O_5^+$	$Cr(CO)_6$	CO	9.17 ± 0.04	CS	−3	2023
		$CrC_6O_6^+$ Heat of formation −55 kcal mol^{-1}				
$CrC_6O_6^+$	$Cr(CO)_6$		8.03 ± 0.03	PI	−55*	1167
$CrC_6O_6^+$	$Cr(CO)_6$		8.15 ± 0.17	EVD	−52	1107
$CrC_6O_6^+$	$Cr(CO)_6$		8.18 ± 0.07	CS	−52	2023
		$CrOF^+$				
$CrOF^+$	CrO_2F_2	O + F?	19.8 ± 0.2	LE		30
		CrO_2F^+				
CrO_2F^+	CrO_2F_2	F	16.3 ± 0.3	LE		30
		$CrOF_2^+$				
$CrOF_2^+$	CrO_2F_2	O	16.8 ± 0.4	LE		30
		$CrO_2F_2^+$				
$CrO_2F_2^+$	CrO_2F_2		14.0 ± 0.2	LE		30
		$CrOCl^+$				
$CrOCl^+$	CrO_2Cl_2	O + Cl?	17.0 ± 0.3	LE	175	30
		CrO_2Cl^+				
CrO_2Cl^+	CrO_2Cl_2	Cl	13.9 ± 0.3	LE	163	30
		$CrOCl_2^+$				
$CrOCl_2^+$	CrO_2Cl_2	O	15.8 ± 0.2	LE	176	30
		$CrO_2Cl_2^+$				
$CrO_2Cl_2^+$	CrO_2Cl_2		12.6 ± 0.3	LE	162	30

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
Mn^+ Heat of formation 240 kcal mol^{-1}						
Mn^+	Mn		7.434	S	240*	2113
Mn^+	Mn		7.7±0.3	VC	246	2161
Mn^+	$C_5H_5Mn(CO)_3$ (Cyclopentadienylmanganese tricarbonyl)		15.9±0.3	EVD		1381
MnF^+						
MnF^+	MnF		8.7±0.3	VC	187	2161
MnF^+	MnF_2	F	14.5	VC	202	2161
MnF_2^+						
MnF_2^+	MnF_2		11.5±0.3	VC	152	2161
$C_5H_5Mn^+$						
$C_5H_5Mn^+$	$C_5H_5Mn(CO)_3$ (Cyclopentadienylmanganese tricarbonyl)	3CO	12.0±0.3	EVD	248	1381
$C_6H_5OMn^+$						
$C_6H_5OMn^+$	$C_5H_5Mn(CO)_3$ (Cyclopentadienylmanganese tricarbonyl)	2CO	9.8±0.3	EVD	171	1381
$C_8H_5O_3Mn^+$						
$C_8H_5O_3Mn^+$	$C_5H_5Mn(CO)_3$ (Cyclopentadienylmanganese tricarbonyl)		8.3±0.4	EVD	83*	1381
Fe^+ Heat of formation 282 kcal mol^{-1}						
Fe^+	Fe		7.90±0.01	S	282*	2113
Fe^+	FeF_2	F_2	16.5±0.3	VC	287	1280
Fe^+	$FeCl_2$	2Cl	16.5±0.5	LE	287	397
Fe^+	$FeBr_2$	2Br	16.6±0.5	LE	318	174
Fe^+	$Fe(CO)_5$	5CO	16.1±0.2	EVD	328	112
Fe^+	$Fe(CO)_5$	5CO	14.7±0.1	CS	296	2023
FeF^+						
FeF^+	FeF_2	F	12.6±0.3	VC	179	1280
FeF_2^+						
FeF_2^+	FeF_2		11.3±0.3	VC	167	1280
$FeCl^+$						
$FeCl^+$	$FeCl_2$	Cl	12.8±0.5	LE	231	397
$FeCl_2^+$						
$FeCl_2^+$	$FeCl_2$		11.5±0.5	LE	230	397
$Fe_2Cl_3^+$						
$Fe_2Cl_3^+$	Fe_2Cl_4	Cl	12.0±1.0	LE	143	397

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$Fe_2Cl_4^+$				
$Fe_2Cl_4^+$	Fe_2Cl_4		10.5 ± 1.0	LE	137	397
		$FeCO^+$				
$FeCO^+$	$Fe(CO)_5$	4CO	14.0 ± 0.2	EVD	253	112
$FeCO^+$	$Fe(CO)_5$	4CO	12.9 ± 0.1	CS	228	2023
		$FeCO^{+2}$				
$FeCO^{+2}$	$Fe(CO)_5$	4CO	30.2 ± 2	EVD	627	112
		$FeC_2O_2^+$				
$FeC_2O_2^+$	$Fe(CO)_5$	3CO	11.8 ± 0.2	EVD	176	112
$FeC_2O_2^+$	$Fe(CO)_5$	3CO	10.92 ± 0.04	CS	156	2023
		$FeC_3O_3^+$				
$FeC_3O_3^+$	$Fe(CO)_5$	2CO	10.3 ± 0.3	EVD	115	112
$FeC_3O_3^+$	$Fe(CO)_5$	2CO	9.89 ± 0.05	CS	106	2023
		$FeC_4O_4^+$				
$FeC_4O_4^+$	$Fe(CO)_5$	CO	10.0 ± 0.2	EVD	82	112
$FeC_4O_4^+$	$Fe(CO)_5$	CO	8.34 ± 0.12	CS	43	2023
		$FeC_5O_5^+$ Heat of formation 8 kcal mol^{-1}				
$FeC_5O_5^+$	$Fe(CO)_5$		7.95 ± 0.03	PI	8*	1167
$FeC_5O_5^+$	$Fe(CO)_5$		8.53 ± 0.2	EVD	21	112
$FeC_5O_5^+$	$Fe(CO)_5$		8.14 ± 0.06	CS	12	2023
		Co^+ Heat of formation 283 kcal mol^{-1}				
Co^+	Co		7.87 ± 0.02	S	283*	2113
Co^+	$C_5H_5Co(CO)_2$ (Cyclopentadienylcobalt dicarbonyl)		16.8 ± 0.3	EVD		1381
		$C_3H_3Co^+$				
$C_3H_3Co^+$	$C_5H_5Co(CO)_2$ (Cyclopentadienylcobalt dicarbonyl)		16.8 ± 0.3	EVD		1381
		$C_5H_5Co^+$				
$C_5H_5Co^+$	$C_5H_5Co(CO)_2$ (Cyclopentadienylcobalt dicarbonyl)	2CO	11.7 ± 0.2	EVD	267	1381
		$CoCO^+$				
$CoCO^+$	$C_5H_5Co(CO)_2$ (Cyclopentadienylcobalt dicarbonyl)		16.5 ± 0.4	EVD		1381

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_6H_5OCo^+$				
$C_6H_5OCo^+$ (Cyclopentadienylcobalt dicarbonyl)	$C_5H_5Co(CO)_2$	CO	10.1 ± 0.2	EVD	203	1381
		$C_7H_5O_2Co^+$				
$C_7H_5O_2Co^+$ (Cyclopentadienylcobalt dicarbonyl)	$C_5H_5Co(CO)_2$		8.3 ± 0.2	EVD	135*	1381
		Ni^+ Heat of formation 279 kcal mol^{-1}				
Ni^+	Ni		7.635	S	279*	2113
Ni^+	Ni		7.5 ± 0.5	LE	276	2125
Ni^+	Ni		7.6 ± 0.3	NS	278	2188
Ni^+	NiF_2	2F	16.7 ± 0.3	VC	271	2162
Ni^+	$NiCl_2$	2Cl	15.7 ± 0.5	LE	277	2125
Ni^+	$Ni(CO)_4$	4CO	16.0 ± 0.3	EVD	331	112
		NiO^+				
NiO^+	NiO		9.5 ± 0.3	NS	295	2188
		NiF^+				
NiF^+	NiF_2	F	13.0 ± 0.3	VC	205	2162
		NiF_2^+				
NiF_2^+	NiF_2		11.5 ± 0.3	VC	189	2162
		$NiCl^+$				
$NiCl^+$	NiCl		11.4 ± 0.5	LE	278	2125
$NiCl^+$	$NiCl_2$	Cl	12.7 ± 0.5	LE	237	2125
		$NiCl_2^+$				
$NiCl_2^+$	$NiCl_2$		11.2 ± 0.5	LE	231	2125
		$NiCO^+$				
$NiCO^+$	$Ni(CO)_4$	3CO	13.5 ± 0.2	EVD	246	112
		$NiC_2O_2^+$				
$NiC_2O_2^+$	$Ni(CO)_4$	2CO	10.7 ± 0.2	EVD	155	112
		$NiC_2O_2^{+2}$				
$NiC_2O_2^{+2}$	$Ni(CO)_4$	2CO	28.3 ± 1	EVD	561	112
		$NiC_3O_3^+$				
$NiC_3O_3^+$	$Ni(CO)_4$	CO	9.36 ± 0.15	EVD	98	112
		$NiC_4O_4^+$ Heat of formation 47 kcal mol^{-1}				
$NiC_4O_4^+$	$Ni(CO)_4$		8.28 ± 0.03	PI	47*	1167
$NiC_4O_4^+$	$Ni(CO)_4$		8.64 ± 0.15	EVD	55	112

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
Cu^+ Heat of formation 259 kcal mol^{-1}						
Cu^+	Cu		7.726	S	259*	2113
Cu^+	CuF_2	2F	16.5 ± 0.3	VC	274	1458
CuF^+						
CuF^+	CuF		8.6 ± 0.3	VC	210	1458
CuF^+	CuF_2	F	12.4 ± 0.3	VC	198	1458
CuF_2^+						
CuF_2^+	CuF_2		11.3 ± 0.3	VC	192	1458
Ge^+ Heat of formation 272 kcal mol^{-1}						
Ge^+	Ge		7.89	S	272*	2113
Ge^+	GeH_4	$2H_2$	10.7 ± 0.2	LE	269	2116
Ge^+	GeH_4	$H_2 + 2H$	14.1 ± 0.5	LE	243	2116
Ge^+	GeH_4	4H	18.3 ± 0.3	LE	235	2116
Ge^+	Ge_2H_6	$Ge + 3H_2$?	13.3 ± 0.3	LE	256	2133
Ge^+	Ge_3H_8	$2Ge + 4H_2$?	16.3 ± 0.3	LE	250	2133
Ge^+	GeO	O	14.0 ± 1	LE	252	1255
Ge^+	GeTe	Te	12.6 ± 0.5	NS	286	1023
Ge^+	$(CH_3)_4Ge$	$4CH_3$	19.2 ± 0.5	EVD	275	83
Ge_2^+						
Ge_2^+	Ge_2H_6	$3H_2$?	13.1 ± 0.3	LE	341	2133
Ge_2^+	Ge_3H_8	$Ge + 4H_2$?	15.8 ± 0.3	LE	329	2133
Ge_3^+						
Ge_3^+	Ge_3H_8	$4H_2$	14.6 ± 0.3	LE	391	2133
GeH^+						
GeH^+	GeH_4	$H_2 + H$	11.3 ± 0.3	LE	230	2116
GeH^+	GeH_4	3H	16.8 ± 0.3	LE	253	2116
GeH_2^+						
GeH_2^+	GeH_4	H_2	11.8 ± 0.2	LE	294	2116
GeH_2^+	GeH_4	2H	15.4 ± 0.3	LE	273	2116
GeH_3^+						
GeH_3^+	GeH_4	H	10.80 ± 0.07	LE	219	2002, 2116
GeH_3^+	Ge_2H_6	GeH_3	10.26 ± 0.10	LE	237	2002
GeH_3^+	$GeSiH_6$	SiH_3	11.32 ± 0.14	LE		2002
Ge_2H^+						
Ge_2H^+	Ge_2H_6	$2H_2 + H$	13.0 ± 0.3	LE	286	2133
$Ge_2H_2^+$						
$Ge_2H_2^+$	Ge_2H_6	$2H_2$	12.9 ± 0.3	LE	336	2133

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$Ge_2H_3^+$				
$Ge_2H_3^+$	Ge_2H_6	$H_2 + H$	12.8 ± 0.3	LE	282	2133
		$Ge_2H_4^+$				
$Ge_2H_4^+$	Ge_2H_6	H_2	12.7 ± 0.3	LE	332	2133
		$Ge_2H_5^+$				
$Ge_2H_5^+$	Ge_2H_6	H	12.6 ± 0.3	LE	277	2133
		$Ge_2H_6^+$				
$Ge_2H_6^+$	Ge_2H_6		12.5 ± 0.3	LE	327	2133
		Ge_3H^+				
Ge_3H^+	Ge_3H_8	$3H_2 + H$	11.8 ± 0.3	LE	274	2133
		$Ge_3H_2^+$				
$Ge_3H_2^+$	Ge_3H_8	$3H_2$	10.7 ± 0.3	LE	301	2133
		$Ge_3H_3^+$				
$Ge_3H_3^+$	Ge_3H_8	$2H_2 + H$	10.6 ± 0.3	LE	247	2133
		$Ge_3H_4^+$				
$Ge_3H_4^+$	Ge_3H_8	$2H_2$	10.4 ± 0.3	LE	294	2133
		$Ge_3H_5^+$				
$Ge_3H_5^+$	Ge_3H_8	$H_2 + H$	10.1 ± 0.3	LE	235	2133
		$Ge_3H_6^+$				
$Ge_3H_6^+$	Ge_3H_8	H_2	10.0 ± 0.3	LE	285	2133
		$Ge_3H_7^+$				
$Ge_3H_7^+$	Ge_3H_8	H	9.9 ± 0.3	LE	230	2133
		$Ge_3H_8^+$				
$Ge_3H_8^+$	Ge_3H_8		9.6 ± 0.3	LE	276	2133
		GeO^+				
GeO^+	GeO		10.1 ± 0.8	LE	222	1255
		Ge_2O^+				
Ge_2O^+	Ge_2O_2	O	14.3 ± 1.0	LE	158	1255

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$Ge_2O_2^+$				
$Ge_2O_2^+$	Ge_2O_2		8.7 ± 1.0	LE	89	1255
		$Ge_3O_3^+$				
$Ge_3O_3^+$	Ge_3O_3		8.6 ± 1.0	LE	-14	1255
		CH_3Ge^+				
CH_3Ge^+	$(CH_3)_4Ge$	$3CH_3$	16.8 ± 0.4	EVD	253	83
		$C_2H_6Ge^+$				
$C_2H_6Ge^+$	$(CH_3)_4Ge$	$2CH_3$	14.1 ± 0.2	EVD	224	83
		$C_3H_9Ge^+$				
$C_3H_9Ge^+$	$(CH_3)_4Ge$	CH_3	10.2 ± 0.1	EVD	167	83
		$C_4H_{12}Ge^+$				
$C_4H_{12}Ge^+$	$(CH_3)_4Ge$		9.2 ± 0.2	EVD	177*	83
		$GeSiH_6^+$				
$GeSiH_6^+$	$GeSiH_6$		10.20 ± 0.03	LE	263	2002
		As^+ Heat of formation 299 kcal mol^{-1}				
As^+	As		9.815	S	299*	2113
As^+	AsH_3	$H_2 + H$	14.8 ± 0.2	LE	305	2116
As^+	AsH_3	$3H$	19.4 ± 0.2	LE	307	2116
As^+	As_2H_4	$As + 2H_2$	14.3 ± 0.3	LE	(a)	2133
		As_2^+				
As_2^+	As_2H_4	$2H_2$	13.0 ± 0.3	LE	341	2133
		As_4^+				
As_4^+	As_4		9.07 ± 0.07	SL	244*	1047
		AsH^+				
AsH^+	AsH_3	H_2	12.4 ± 0.2	LE	302	2116
AsH^+	AsH_3	$2H$	16.8 ± 0.4	LE	299	2116
		AsH_2^+				
AsH_2^+	AsH_3	H	14.5 ± 0.2	LE	298	2116
		AsH_3^+ Heat of formation 247 kcal mol^{-1}				
AsH_3^+	AsH_3		10.03	PI	247*	1091
AsH_3^+	AsH_3		10.6 ± 0.1	EVD	260	1007
AsH_3^+	AsH_3		12.1 ± 0.2	LE	295	2116

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		As_2H^+				
As_2H^+	As_2H_4	$H_2 + H$	12.7 ± 0.3	LE	282	2133
		$As_2H_2^+$				
$As_2H_2^+$	As_2H_4	H_2	12.6 ± 0.3	LE	332	2133
		$As_2H_3^+$				
$As_2H_3^+$	As_2H_4	H	12.5 ± 0.3	LE	277	2133
		$As_2H_4^+$				
$As_2H_4^+$	As_2H_4		12.2 ± 0.3	LE	323	2133
		$AsCl_3^+$				
$AsCl_3^+$	$AsCl_3$		11.7 ± 0.1	EVD	208*	1007
		CH_5As^+				
CH_5As^+	CH_3AsH_2		9.7 ± 0.1	EVD		1007
		$C_2H_7As^+$				
$C_2H_7As^+$	$(CH_3)_2AsH$		9.0 ± 0.1	EVD		1007
		$C_3H_9As^+$				
$C_3H_9As^+$	$(CH_3)_3As$		8.3 ± 0.1	EVD	195*	1007
		$C_{18}H_{15}As^+$				
$C_{18}H_{15}As^+$ (Triphenylarsine)	$(C_6H_5)_3As$		7.34 ± 0.07	PI	269*	1140
		$C_3F_9As^+$				
$C_3F_9As^+$	$(CF_3)_3As$		11.0 ± 0.1	EVD		1007
		$C_3H_6F_3As^+$				
$C_3H_6F_3As^+$	$(CH_3)_2AsCF_3$		9.2 ± 0.1	EVD		1007
		$C_2HF_6As^+$				
$C_2HF_6As^+$	$(CF_3)_2AsH$		10.9 ± 0.1	EVD		1007
		$C_3H_3F_6As^+$				
$C_3H_3F_6As^+$	$(CF_3)_2AsCH_3$		10.5 ± 0.1	EVD		1007
		$C_2H_6ClAs^+$				
$C_2H_6ClAs^+$	$(CH_3)_2AsCl$		9.9 ± 0.1	EVD		1007
		$CH_3Cl_2As^+$				
$CH_3Cl_2As^+$	CH_3AsCl_2		10.4 ± 0.1	EVD		1007

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2F_6ClAs^+$				
$C_2F_6ClAs^+$	$(CF_3)_2AsCl$		11.0 ± 0.1	EVD		1007
		Se^+ Heat of formation 279 kcal mol^{-1}				
Se^+	Se		9.752	S	279*	2113
Se^+	SnSe	Sn	12.7 ± 0.5	LE	251	2063
		Br^+ Heat of formation 300 kcal mol^{-1}				
Br^+	Br		11.85	S	300*	2113
Br^+	Br_2	Br^-	10.38 ± 0.05	RPD	302	292
Br^+	Br_2	Br^-	12.30 ± 0.06	RPD		292
Br^+	Br_2	Br	14.31 ± 0.03	RPD	311	292
Br^+	Br_2	Br	15.88 ± 0.04	RPD		292
Br^+	Br_2	Br	17.06 ± 0.04	RPD		292
Br^+	Br_2	Br	17.97 ± 0.06	RPD		292
Br^+	Br_2	Br	19.98 ± 0.06	RPD		292
Br^+	CBr_4		18.1 ± 0.2	EVD		1246
Br^+	CBr_4		21.4 ± 0.6	EVD		1246
Br^+	$MgBr_2$	MgBr	16 ± 1	NS	307	178
Br^+	CH_3Br	CH_3^-?	13.8 ± 0.05	RPD		2154
Br^+	CH_3Br	CH_3	14.7 ± 0.05	RPD	297	2154
Br^+	CH_3Br	CH_3	16.6 ± 0.05	RPD		2154
Br^+	CH_3Br	CH_3	17.6 ± 0.05	RPD		2154
Br^+	CH_3Br	CH_3	18.5 ± 0.05	RPD		2154
Br^+	C_2H_5Br	$CH_3 + CH_2$	18.6 ± 0.3	VC	287	356
Br^+	$CH_3C{\equiv}CBr$	C_3H_3	16.0 ± 0.5	VC	(b)	13
Br^+	CNBr	CN^-	11.9 ± 0.2	SL		73
Br^+	CNBr	CN	16.2 ± 0.1	SL	318	73
Br^+	CF_3Br	CF_3	16.7 ± 0.1	EVD	346	439
Br^+	CF_3Br	CF_3	17.6 ± 1	SL	366	24
Br^+	CF_3Br	$CF_2 + F$	21.0 ± 0.2	LE	347	439
		$Br_2^+(^2\Pi_{3/2g})$ Heat of formation 250 kcal mol^{-1}				
		$Br_2^+(^2\Pi_{1/2g})$ 261 kcal mol^{-1}				
$Br_2^+(^2\Pi_{3/2g})$	Br_2		10.53 ± 0.03	PI	250*	213
$Br_2^+(^2\Pi_{3/2g})$	Br_2		10.55 ± 0.02	PI	251*	182, 416
$Br_2^+(^2\Pi_{1/2g})$	Br_2		11.0 ± 0.1	PI	261*	213
$Br_2^+(^2\Pi_{3/2g})$	Br_2		10.69 ± 0.03	RPD	254	292
$Br_2^+(^2\Pi_{1/2g})$	Br_2		11.05 ± 0.05	RPD	262	292
$Br_2^+(^2\Pi_{3/2g})$	Br_2		11.97 ± 0.03	RPD	283	292
$Br_2^+(^2\Pi_{1/2u})$	Br_2		12.36 ± 0.04	RPD	292	292
$Br_2^+(^2\Sigma_u^+)$	Br_2		13.72 ± 0.04	RPD	324	292
Br_2^+	Br_2		10.58 ± 0.08	SL	251	75
Br_2^+	Br_2		10.7 ± 0.3	VC	254	357
Br_2^+	$MgBr_2$	Mg	17 ± 1	NS	282	178
		Br_2^{+2}				
Br_2^{+2}	Br_2		30.0	NS	692	75
		HBr^+				
HBr^+	HBr		11.62 ± 0.01	PI	259*	182, 416

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		DBr^{+2}				
DBr^{+2}	DBr		33.2 ± 0.3	FDP		212
		$LiBr^{+}$				
$LiBr^{+}$	LiBr		9.4	VC	182	2179
		Li_2Br^{+}				
Li_2Br^{+}	Li_2Br_2	Br	9.9	VC	84	2179
		BBr^{+}				
BBr^{+}	BBr		10.7 ± 0.2	VC		206
BBr^{+}	BBr		11.8 ± 0.2	VC		206
BBr^{+}	BBr_3	Br_2?	15.0 ± 0.2	VC	289	206
		BBr_2^{+}				
BBr_2^{+}	BBr_3	Br	10.7 ± 0.2	VC	171	206
BBr_2^{+}	BBr_3	Br	10.8 ± 0.2	VC	173	206
BBr_2^{+}	BBr_3	Br	11.0 ± 0.2	VC	178	206
		BBr_3^{+}				
BBr_3^{+}	BBr_3		9.7 ± 0.2	VC	175	206
		CBr^{+}				
CBr^{+}	CBr		10.43 ± 0.02	NS	374	129
CBr^{+}	CBr_4	Br_2+Br?	17.5 ± 0.2	EVD	388	1246
CBr^{+}	CBr_4	3Br	19.5 ± 0.4	EVD	388	1246
CBr^{+}	CBr_4	Br_2 + Br?	16.35 ± 0.13	NS	362	129
CBr^{+}	CNBr	N	17.4 ± 0.2	SL	333	73
		CBr_2^{+}				
CBr_2^{+}	CBr_2		10.11 ± 0.09	NS	328	129
CBr_2^{+}	CBr_4	Br_2	14.6 ± 0.3	EVD	348	1246
CBr_2^{+}	CBr_4	2Br	16.2 ± 0.4	EVD	339	1246
CBr_2^{+}	CBr_4	Br_2	12.30 ± 0.08	NS	295	129
		CBr_3^{+}				
CBr_3^{+}	CBr_4	Br	11.3 ± 0.2	EVD	253	1246
CBr_3^{+}	CBr_4	Br	9.95 ± 0.05	NS	222	129
		CBr_4^{+}				
CBr_4^{+}	CBr_4		11.0 ± 0.5	EVD	273	1246
		BrF^{+}				
BrF^{+}	BrF_5		20	VC		357
		BrF_2^{+}				
BrF_2^{+}	BrF_3	F	13.5 ± 0.3	VC	231	357
BrF_2^{+}	BrF_5	F_2 + F?	16.1 ± 0.2	VC	250	357

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		BrF_3^+				
BrF_3^+	BrF_3		12.9 ± 0.3	VC	236	357
BrF_3^+	BrF_5	F_2	15.5 ± 0.2	VC	255	357
		BrF_4^+				
BrF_4^+	BrF_5	F	14.0 ± 0.3	VC	202	357
		$MgBr^+$				
$MgBr^+$	$MgBr_2$	Br	12.0 ± 0.4	VC	175	178
$MgBr^+$	$MgBr_2$	Br	13.6 ± 0.4	VC	212	178
		$MgBr_2^+$				
$MgBr_2^+$	$MgBr_2$		10.65 ± 0.15	VC	171*	178
		$Mg_2Br_3^+$				
$Mg_2Br_3^+$	Mg_2Br_4	Br	10.8 ± 0.3	VC	35	178
		$BrCl^+$				
$BrCl^+$	BrCl		11.1 ± 0.2	VC	259*	357
		$FeBr^+$				
$FeBr^+$	$FeBr_2$	Br	12.9 ± 0.5	LE	260	174
		$FeBr_2^+$				
$FeBr_2^+$	$FeBr_2$		10.7 ± 0.5	LE	236	174
		$Fe_2Br_3^+$				
$Fe_2Br_3^+$	Fe_2Br_4	Br	13.6 ± 0.5	LE	224	174
		$Fe_2Br_4^+$				
$Fe_2Br_4^+$	Fe_2Br_4		12.6 ± 0.5	LE	228	174
		$B_5H_8Br^+$				
$B_5H_8Br^+$	B_5H_8Br		9.5 ± 0.1	EVD		1102
		CH_2Br^+				
CH_2Br^+	CH_2Br		9.30	SL	261	141
CH_2Br^+	CH_2Br		8.34 ± 0.11	NS	239	131
CH_2Br^+	CH_3Br	H−?	13.0	RPD	258	160
CH_2Br^+	CH_3Br	H−?	14.3	RPD		160
CH_2Br^+	CH_3Br	H	12.12 ± 0.09	RPD	219	1139
CH_2Br^+	CH_3Br	H	13.6	RPD	253	160
CH_2Br^+	CH_3Br	H	15.0	RPD		160
CH_2Br^+	CH_3Br	H	13.4 ± 0.2	VC	249	356
CH_2Br^+	C_2H_5Br	CH_3	14.1 ± 0.1	VC	277	356
CH_2Br^+	CH_2Br_2	Br	10.93 ± 0.04	NS	224	131

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CH_3Br^+(^2E_{1/2})$ Heat of formation 234 kcal mol^{-1}				
		$CH_3Br^+(^2E_{3/2})$ 242 kcal mol^{-1}				
$CH_3Br^+(^2E_{1/2})$	CH_3Br		10.541 ± 0.003	S	235*	2064
$CH_3Br^+(^2E_{1/2})$	CH_3Br		10.528 ± 0.005	PI	234*	1253
$CH_3Br^+(^2E_{1/2})$	CH_3Br		10.53 ± 0.01	PI	234*	182, 416
$CH_3Br^+(^2E_{1/2})$	CH_3Br		10.53 ± 0.02	RPD	234	289
$CH_3Br^+(^2E_{3/2})$	CH_3Br		10.856 ± 0.003	S	242*	2064
$CH_3Br^+(^2E_{3/2})$	CH_3Br		10.857 ± 0.010	PI	242*	1253
$CH_3Br^+(^2E_{3/2})$	CH_3Br		10.8 ± 0.05	RPD	241	2154
$CH_3Br^+(^2E_{3/2})$	CH_3Br		10.85 ± 0.03	RPD	242	289
CH_3Br^+	CH_3Br		11.5 ± 0.05	RPD		2154
CH_3Br^+	CH_3Br		11.62 ± 0.04	RPD		289
CH_3Br^+	CH_3Br		12.9 ± 0.05	RPD		2154
CH_3Br^+	CH_3Br		12.94 ± 0.05	RPD		289
CH_3Br^+	CH_3Br		19.13 ± 0.15	RPD		289
		$C_2H_2Br^+$				
$C_2H_2Br^+$	*cis*-$C_2H_2Br_2$	Br	11.44 ± 0.05	SL	260	114
$C_2H_2Br^+$	*trans*-$C_2H_2Br_2$	Br	11.65 ± 0.05	SL	264	114
		$C_2H_3Br^+$ Heat of formation 243 kcal mol^{-1}				
$C_2H_3Br^+$	C_2H_3Br		9.80 ± 0.01	PI	243*	182
$C_2H_3Br^+$	C_2H_3Br		9.80	PI	243*	168
$C_2H_3Br^+$	C_2H_3Br		9.82 ± 0.02	PI	243*	268
$C_2H_3Br^+$	C_2H_3Br		10.300	PI		268
$C_2H_3Br^+$	C_2H_3Br		9.97 ± 0.05	EVD	247	268
		$C_2H_5Br^+(^2E_{1/2})$ Heat of formation 222 kcal mol^{-1}				
		$C_2H_5Br^+(^2E_{3/2})$ 229 kcal mol^{-1}				
$C_2H_5Br^+(^2E_{1/2})$	C_2H_5Br		10.29 ± 0.02	S	222*	2065
$C_2H_5Br^+(^2E_{1/2})$	C_2H_5Br		10.29 ± 0.01	PI	222*	182, 416
$C_2H_5Br^+(^2E_{3/2})$	C_2H_5Br		10.61 ± 0.02	S	229*	2065
$C_2H_5Br^+(^2E_{3/2})$	C_2H_5Br		10.7	RPD	231	160
$C_2H_5Br^+$	C_2H_5Br		11.1	RPD		160
$C_2H_5Br^+$	C_2H_5Br		12.3	RPD		160
$C_2H_5Br^+$	C_2H_5Br		13.1	RPD		160
$C_2H_5Br^+$	C_2H_5Br		10.7 ± 0.1	VC	231	356
$C_2H_5Br^+$	C_2H_5Br		11.1	TC		2038
$C_2H_5Br^+$	C_2H_5Br		12.2	TC		2038
$C_2H_5Br^+$	C_2H_5Br		13.2	TC		2038
		$C_3H_3Br^+$				
$C_3H_3Br^+$	$CH_3C{\equiv}CBr$		10.1 ± 0.1	VC	282*	13
		$C_3H_5Br^+$				
$C_3H_5Br^+$	$CH_3CH{=}CHBr$		9.30 ± 0.05	PI	224*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		***n*-$C_3H_7Br^+$ ($^2E_{1/2}$) Heat of formation 216 kcal mol^{-1}**				
		***iso*-$C_3H_7Br^+$ 208 kcal mol^{-1}**				
$C_3H_7Br^+(^2E_{1/2})$	*n*-C_3H_7Br		10.18 ± 0.01	PI	216*	182
$C_3H_7Br^+(^2E_{3/2})$	*n*-C_3H_7Br		10.55	RPD	225	160
$C_3H_7Br^+$	*n*-C_3H_7Br		10.8	RPD		160
$C_3H_7Br^+$	*n*-C_3H_7Br		11.4	RPD		160
$C_3H_7Br^+$	*n*-C_3H_7Br		12.1	RPD		160
$C_3H_7Br^+$	*n*-C_3H_7Br		12.9	RPD		160
$C_3H_7Br^+$	*n*-C_3H_7Br		10.8	TC		2038
$C_3H_7Br^+$	*n*-C_3H_7Br		11.7	TC		2038
$C_3H_7Br^+$	*n*-C_3H_7Br		12.4	TC		2038
$C_3H_7Br^+$	*n*-C_3H_7Br		13.2	TC		2038
$C_3H_7Br^+$	*iso*-C_3H_7Br		10.075 ± 0.01	PI	208*	182
$C_3H_7Br^+$	*iso*-C_3H_7Br		11.0	TC		2038
$C_3H_7Br^+$	*iso*-C_3H_7Br		11.2	TC		2038
$C_3H_7Br^+$	*iso*-C_3H_7Br		12.7	TC		2038
$C_3H_7Br^+$	*iso*-C_3H_7Br		13.2	TC		2038
		$C_4H_9Br^+$				
$C_4H_9Br^+$	*n*-C_4H_9Br		10.125 ± 0.01	PI	208*	416, 182
$C_4H_9Br^+$	*sec*-C_4H_9Br		9.98 ± 0.01	PI	206*	182
$C_4H_9Br^+$	*iso*-C_4H_9Br		10.09 ± 0.02	PI	208*	182
$C_4H_9Br^+$	*tert*-C_4H_9Br		9.89 ± 0.03	PI	201*	182
		$C_5H_4Br^+$				
$C_5H_4Br^+$ (Bromocyclopentadienyl radical)	C_5H_4Br		8.85	SL		126
		$C_5H_{11}Br^+$				
$C_5H_{11}Br^+$	*n*-$C_5H_{11}Br$		10.10 ± 0.02	PI	205*	182
		$C_6H_5Br^+$				
$C_6H_5Br^+$ (Bromobenzene)	C_6H_5Br		8.98 ± 0.02	PI	231*	182, 416
$C_6H_5Br^+$ (Bromobenzene)	C_6H_5Br		9.52	SL	244	1066
$C_6H_5Br^+$ (Bromobenzene)	C_6H_5Br		10.05 ± 0.1	SL	256	301
		$C_7H_7Br^+$				
$C_7H_7Br^+$ (Benzyl bromide)	$C_6H_5CH_2Br$		9.10 ± 0.05	CS	229*	2025
$C_7H_7Br^+$ (*o*-Bromotoluene)	$C_6H_4BrCH_3$		8.78 ± 0.01	PI	218*	416, 182
$C_7H_7Br^+$ (*m*-Bromotoluene)	$C_6H_4BrCH_3$		8.81 ± 0.02	PI	218*	182
$C_7H_7Br^+$ (*p*-Bromotoluene)	$C_6H_4BrCH_3$		8.67 ± 0.02	PI	215*	182, 416
$C_7H_7Br^+$ (*p*-Bromotoluene)	$C_6H_4BrCH_3$		9.22	SL	228	1066
$C_7H_7Br^+$ (Bromotoluene)	$C_6H_4BrCH_3$		9.17	TC	226	2194

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$CHBr_2^+$				
$CHBr_2^+$	$CHBr_2$		8.13 ± 0.16	NS	238	131
$CHBr_2^+$	$CHBr_3$	Br	10.80 ± 0.01	NS	226	131
		$CH_2Br_2^+$				
$CH_2Br_2^+$	CH_2Br_2		10.49 ± 0.02	PI	241*	182
		***cis*-$C_2H_2Br_2^+$ Heat of formation 241 kcal mol^{-1}**				
		***trans*-$C_2H_2Br_2^+$ 240 kcal mol^{-1}**				
$C_2H_2Br_2^+$	*cis*-$C_2H_2Br_2$		9.45 ± 0.01	PI	241*	114, 1058, 1190, 268
$C_2H_2Br_2^+$	*cis*-$C_2H_2Br_2$		9.45	PI	241*	168
$C_2H_2Br_2^+$	*cis*-$C_2H_2Br_2$		9.69 ± 0.05	EVD	246	114, 268, 1058, 1190
$C_2H_2Br_2^+$	*trans*-$C_2H_2Br_2$		9.46 ± 0.01	PI	240*	114, 1058, 1190, 268
$C_2H_2Br_2^+$	*trans*-$C_2H_2Br_2$		9.47	PI	240*	168
$C_2H_2Br_2^+$	*trans*-$C_2H_2Br_2$		9.54 ± 0.05	EVD	242	114, 268, 1058, 1190
$C_2H_2Br_2^+$	CHBr=CHBr		9.45 ± 0.01	PI		182
$C_2H_2Br_2^+$	CHBr=CHBr		9.84	PI		268
		$C_2H_4Br_2^+$				
$C_2H_4Br_2^+$	CH_3CHBr_2		10.19 ± 0.03	PI	228*	182
		$C_3H_6Br_2^+$				
$C_3H_6Br_2^+$	1,3-$C_3H_6Br_2$		10.07 ± 0.02	PI	221*	182
		$CHBr_3^+$				
$CHBr_3^+$	$CHBr_3$		10.51 ± 0.02	PI	246*	182
		$C_2HBr_3^+$				
$C_2HBr_3^+$	C_2HBr_3		9.27 ± 0.01	PI	240*	182
$C_2HBr_3^+$	C_2HBr_3		9.27	PI	240*	168
		$CNBr^+$				
$CNBr^+$	CNBr		11.95 ± 0.08	SL	320*	73
		CF_2Br^+				
CF_2Br^+	CF_3Br	F	15.0 ± 0.1	EVD	173	439
CF_2Br^+	CF_3Br	F	15.0 ± 0.7	SL	173	24
		CF_3Br^+ Heat of formation 121 kcal mol^{-1}				
CF_3Br^+	CF_3Br		11.82 ± 0.02	EVD	119*	439
CF_3Br^+	CF_3Br		11.89 ± 0.10	SL	121*	1131
CF_3Br^+	CF_3Br		11.97 ± 0.08	SL	122*	1131
CF_3Br^+	CF_3Br		12.3 ± 0.3	SL	130	24

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_6F_5Br^+$				
$C_6F_5Br^+$ (Bromopentafluorobenzene)	C_6F_5Br		9.6 ± 0.1	SL		301
		$CF_2Br_2^+$				
$CF_2Br_2^+$	CF_2Br_2		11.07 ± 0.03	PI		182
		$CFBr_3^+$				
$CFBr_3^+$	$CFBr_3$		10.67 ± 0.01	PI		182
		$C_5H_4NBr^+$				
$C_5H_4NBr^+$ (2-Bromopyridine)	C_5H_4NBr		9.65 ± 0.05	SL	261*	217
$C_5H_4NBr^+$ (4-Bromopyridine)	C_5H_4NBr		9.94 ± 0.05	SL	267*	217
		$C_8H_{10}NBr^+$				
$C_8H_{10}NBr^+$ (*N*,*N*-Dimethyl-*p*-bromoaniline)	$C_6H_4BrN(CH_3)_2$		7.33	CTS	193	1281
		$C_{10}H_{14}NBr^+$				
$C_{10}H_{14}NBr^+$ (*N*,*N*-Diethyl-*p*-bromoaniline)	$C_6H_4BrN(C_2H_5)_2$		6.96	CTS	175	1281
		$C_2H_3OBr^+$				
$C_2H_3OBr^+$	CH_3COBr		10.55 ± 0.05	PI	197*	182
		$C_6H_5OBr^+$				
$C_6H_5OBr^+$ (*p*-Bromophenol)	C_6H_4BrOH		9.04	SL	187*	1066
$C_6H_5OBr^+$ (Bromophenol)	C_6H_4BrOH		9.15	TC	189	2194
		$C_7H_5OBr^+$				
$C_7H_5OBr^+$ (Bromobenzaldehyde)	C_6H_4BrCHO		9.60	TC	212	2194
		$C_8H_7OBr^+$				
$C_8H_7OBr^+$ (Bromoacetophenone)	$C_6H_4BrCOCH_3$		9.31	TC	198	2194
		$C_{13}H_9OBr^+$				
$C_{13}H_9OBr^+$ (Bromobenzophenone)	$C_6H_4BrCOC_6H_5$		9.34	TC	231	2194
		$C_3H_5O_2Br^+$				
$C_3H_5O_2Br^+$	$CH_2BrCOOCH_3$		10.37 ± 0.05	CS	146*	2025

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_8H_7O_2Br^+$				
$C_8H_7O_2Br^+$ (Methyl bromobenzoate)	$C_6H_4BrCOOCH_3$		9.34	TC	150	2194
		$C_6H_4FBr^+$				
$C_6H_4FBr^+$ (p-Bromofluorobenzene)	C_6H_4FBr		8.99 ± 0.03	PI	187*	182
		$C_2H_3FBr_2^+$				
$C_2H_3FBr_2^+$	$CHBrFCH_2Br$		10.75 ± 0.02	PI		182
		$C_2H_2F_2Br_2^+$				
$C_2H_2F_2Br_2^+$	CF_2BrCH_2Br		10.83 ± 0.01	PI	160*	162
		$C_2H_6SiBr^+$				
$C_2H_6SiBr^+$	$(CH_3)_3SiBr$	CH_3	10.97 ± 0.02	RPD	155	1421
		$C_3H_9SiBr^+$				
$C_3H_9SiBr^+$	$(CH_3)_3SiBr$		10.24 ± 0.02	RPD	171*	1421
		$C_4H_3BrS^+$				
$C_4H_3BrS^+$ (2-Bromothiophene)	C_4H_3BrS		8.63 ± 0.01	PI	228*	182
		CH_2ClBr^+				
CH_2ClBr^+	CH_2ClBr		10.77 ± 0.01	PI	236*	182
CH_2ClBr^+	CH_2ClBr		10.75 ± 0.05	SL	236	72
		$C_2H_4ClBr^+$				
$C_2H_4ClBr^+$	CH_2BrCH_2Cl		10.63 ± 0.03	PI	227*	182
		$CHCl_2Br^+$				
$CHCl_2Br^+$	$CHCl_2Br$		10.88 ± 0.05	SL	237*	72
		$CHClBr_2^+$				
$CHClBr_2^+$	$CHClBr_2$		10.59 ± 0.01	PI		182
		Rb^+				
Rb^+	Rb		4.176	S		2113
Rb^+	RbI	I	8.1 ± 0.3	VC		2001
		Sr^+ Heat of formation 171 kcal mol^{-1}				
Sr^+	Sr		5.694	S	171*	2113
Sr^+	Sr		5.8 ± 0.2	NS	173	2178

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		Sr^{+2} Heat of formation 425 kcal mol^{-1}				
Sr^{+2}	Sr		16.724	S	425*	2113
Sr^{+2}	Sr		11.5 ± 0.2	NS		2178
Sr^{+2}	Sr		13.3 ± 0.2	NS		2178
		SrO^+				
SrO^+	SrO		6.1	LE	137	1244, 2123
		Sr_2O^+				
Sr_2O^+	Sr_2O		4.8	LE	55	1244, 2123
		SrF^+				
SrF^+	SrF		4.9 ± 0.3	VC	108	1105
SrF^+	SrF		5.2 ± 0.3	VC	115	1104
SrF^+	SrF_2	F^-?	11	VC	132	1105
		Y^+ Heat of formation 252 kcal mol^{-1}				
Y^+	Y		6.528	S	252*	2113
Y^+	Y		6	LE	240	2167
Y^+	Y		6.4 ± 0.3	LE	249	2151
Y^+	YO	O	12	LE	210	2167
Y^+	YF_3	3F?	28	VC	293	2009
Y^+	YCl_3	3Cl	22.1 ± 0.5	LE	244	2132
		YC^+				
YC^+	YC_2	C	13.4 ± 0.5	LE	281	2151
		YC_2^+				
YC_2^+	YC_2		6.8 ± 0.3	LE	300	2151
		YO^+				
YO^+	YO		5.5	LE	119	2167
		YF^+				
YF^+	YF_3	2F?	21.5	VC	162	2009
		YF_2^+				
YF_2^+	YF_3	F?	13.5	VC	−3	2009
		YCl^+				
YCl^+	YCl_3	2Cl	17.3 ± 0.5	LE	163	2132
		YCl_2^+				
YCl_2^+	YCl_3	Cl	14.5 ± 0.5	LE	127	2132

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		YCl_3^+				
YCl_3^+	YCl_3		12.8 ± 0.5	LE	117	2132
		$Y_2Cl_5^+$				
$Y_2Cl_5^+$	Y_2Cl_6	Cl	13.7 ± 0.5	LE		2132
		Mo^+ Heat of formation 321 kcal mol^{-1}				
Mo^+	Mo		7.099	S	321*	2113
Mo^+	$Mo(CO)_6$	6CO	20.7 ± 0.5	EVD	418	1107
Mo^+	$Mo(CO)_6$	6CO	18.3 ± 0.3	CS	363	2023
		MoC^+				
MoC^+	$Mo(CO)_6$	CO_2 + 4CO?	27.2 ± 0.4	EVD	609	1107
		MoO^+				
MoO^+	MoO		8.0 ± 0.6	LE	285	2126
		MoO_2^+				
MoO_2^+	MoO_2		9.2	LE	215	1244, 2123
MoO_2^+	MoO_2		9.4 ± 0.6	LE	220	2126, 2129
		MoO_3^+				
MoO_3^+	MoO_3		11.8	LE	194	1244, 2123
MoO_3^+	MoO_3		12.0 ± 0.6	LE	199	2126, 2129
		$Mo_2O_5^+$				
$Mo_2O_5^+$	Mo_2O_5		10	LE		2129
$Mo_2O_5^+$	Mo_2O_6	O	14.5	LE	4	2129
		$Mo_2O_6^+$				
$Mo_2O_6^+$	Mo_2O_6		12.1 ± 0.6	LE	8	2129
		$Mo_3O_8^+$				
$Mo_3O_8^+$	Mo_3O_8		12.2	LE		2129
$Mo_3O_8^+$	Mo_3O_9	O	14.5	LE	−176	2129
		$Mo_3O_9^+$				
$Mo_3O_9^+$	Mo_3O_9		12.0 ± 1.0	LE	−174	2129
		$MoCO^+$				
$MoCO^+$	$Mo(CO)_6$	5CO	18.1 ± 0.3	EVD	331	1107
$MoCO^+$	$Mo(CO)_6$	5CO	15.8 ± 0.06	CS	278	2023
		$MoCO^{+2}$				
$MoCO^{+2}$	$Mo(CO)_6$	5CO	34.5 ± 0.5	EVD	710	1107

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$MoC_2O_2^+$				
$MoC_2O_2^+$	$Mo(CO)_6$	4CO	15.6 ± 0.3	EVD	247	1107
$MoC_2O_2^+$	$Mo(CO)_6$	4CO	13.90 ± 0.3	CS	208	2023
		$MoC_2O_2^{+2}$				
$MoC_2O_2^{+2}$	$Mo(CO)_6$	4CO	30.8 ± 0.5	EVD	598	1107
		$MoC_3O_3^+$				
$MoC_3O_3^+$	$Mo(CO)_6$	3CO	13.7 ± 0.3	EVD	177	1107
$MoC_3O_3^+$	$Mo(CO)_6$	3CO	12.36 ± 0.12	CS	146	2023
		$MoC_3O_3^{+2}$				
$MoC_3O_3^{+2}$	$Mo(CO)_6$	3CO	29.1 ± 1.2	EVD	532	1107
		$MoC_4O_4^+$				
$MoC_4O_4^+$	$Mo(CO)_6$	2CO	11.9 ± 0.2	EVD	109	1107
$MoC_4O_4^+$	$Mo(CO)_6$	2CO	11.28 ± 0.14	CS	95	2023
		$MoC_5O_5^+$				
$MoC_5O_5^+$	$Mo(CO)_6$	CO	9.80 ± 0.15	EVD	34	1107
$MoC_5O_5^+$	$Mo(CO)_6$	CO	9.64 ± 0.05	CS	31	2023
		$MoC_6O_6^+$ Heat of formation −31 kcal mol^{-1}				
$MoC_6O_6^+$	$Mo(CO)_6$		8.12 ± 0.03	PI	−31*	1167
$MoC_6O_6^+$	$Mo(CO)_6$		8.23 ± 0.12	EVD	−28	1107
$MoC_6O_6^+$	$Mo(CO)_6$		8.30 ± 0.03	CS	−27	2023
		$SrMoO_2^+$				
$SrMoO_2^+$	$SrMoO_4$	O_2?	11.0	LE	−3	1244
		$SrMoO_3^+$				
$SrMoO_3^+$	$SrMoO_3$		6.2	LE	4	1244
		$SrMoO_4^+$				
$SrMoO_4^+$	$SrMoO_4$		9.2	LE	−45	1244
		Ru^+ Heat of formation 323 kcal mol^{-1}				
Ru^+	Ru		7.366	S	323*	2113
Ru^+	RuO_4	O_2 + 2O?	22.3 ± 0.3	EVD	351	1284
		RuO^+				
RuO^+	RuO_4	O_2 + O?	18.1 ± 0.3	EVD	314	1284

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		RuO_2^+				
RuO_2^+	RuO_4	O_2	14.2 ± 0.2	EVD	283	1284
		RuO_3^+				
RuO_3^+	RuO_4	O	15.7 ± 0.3	EVD	259	1284
		RuO_4^+				
RuO_4^+	RuO_4		12.33 ± 0.23	EVD	240*	1284
		Rh^+ Heat of formation 305 kcal mol^{-1}				
Rh^+	Rh		7.463	S	305*	2113
Rh^+	Rh		7.4	NS	304	1020
		RhO^+				
RhO^+	RhO		9.3	NS	303	1020
		RhO_2^+				
RhO_2^+	RhO_2		10.0	NS	271	1020
		Pd^+ Heat of formation 283 kcal mol^{-1}				
Pd^+	Pd		8.336	S	283*	2113
Pd^+	Pd		8.1	NS	277	1020
		PdO^+				
PdO^+	PdO		9.1	NS		1020
		Cd^+ Heat of formation 234 kcal mol^{-1}				
Cd^+	Cd		8.993	S	234*	2113
Cd^+	Cd		8.93 ± 0.05	SL	233	1047
Cd^+	Cd		9.0 ± 0.2	LE	234	2056
		$CdCl^+$				
$CdCl^+$	$CdCl_2$	Cl	11.8 ± 0.2	LE	191	2056
		$CdCl_2^+$				
$CdCl_2^+$	$CdCl_2$		11.2 ± 0.2	LE	206	2056
		In^+ Heat of formation 192 kcal mol^{-1}				
In^+	In		5.786	S	192*	2113
In^+	In		5.8 ± 0.3	LE	192	2138
In^+	In		5.8 ± 0.5	VC	192	1065
		In_2^+				
In_2^+	In_2		5.8 ± 0.3	LE	225	2138
		In_2O^+				
In_2O^+	In_2O		7.8 ± 0.5	VC	177	1065

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		Sn^+ Heat of formation 242 kcal mol^{-1}				
Sn^+	Sn		7.344	S	242*	2113
Sn^+	SnH_4	$2H_2$	9.0 ± 0.3	LE	246	2116
Sn^+	SnH_4	$2H_2$	11.4 ± 0.2	LE	302	2137
Sn^+	SnH_4	$H_2 + 2H$	13.4 ± 0.4	LE	244	2116
Sn^+	SnH_4	$H_2 + 2H$	15.5 ± 0.2	LE	292	2137
Sn^+	SnH_4	4H	18.3 ± 0.4	LE	253	2116
Sn^+	SnH_4	4H	19.5 ± 0.2	LE	280	2137
Sn^+	Sn_2H_6	$3H_2 + Sn$	10.8 ± 0.3	LE	(a)	2133
Sn^+	SnO	O	13.0 ± 1	NS	244	1243
Sn^+	SnS	S	12.5 ± 0.5	LE	250	2139
Sn^+	SnSe	Se	12.8 ± 0.5	LE	272	2063
Sn^+	$(CH_3)_4Sn$	$4CH_3$	18.1 ± 0.3	EVD	280	82
		Sn_2^+				
Sn_2^+	Sn_2H_6	$3H_2$	10.7 ± 0.3	LE	311	2133
Sn_2^+	Sn_2S_2	S_2?	16.5 ± 1.0	LE	358	2139
		SnH^+				
SnH^+	SnH_4	$H_2 + H$	10.7 ± 0.3	LE	234	2116
SnH^+	SnH_4	$H_2 + H$	13.3 ± 0.2	LE	294	2137
SnH^+	SnH_4	3H	14.8 ± 0.5	LE	224	2116
SnH^+	SnH_4	3H	17.3 ± 0.2	LE	282	2137
		SnH_2^+				
SnH_2^+	SnH_4	H_2	9.5 ± 0.3	LE	258	2116
SnH_2^+	SnH_4	H_2	12.1 ± 0.2	LE	318	2137
SnH_2^+	SnH_4	2H	13.9 ± 0.4	LE	255	2116
SnH_2^+	SnH_4	2H	16.4 ± 0.3	LE	313	2137
		SnH_3^+				
SnH_3^+	SnH_4	H	9.4 ± 0.3	LE	204	2116
SnH_3^+	SnH_4	H	11.9 ± 0.2	LE	261	2137
		Sn_2H^+				
Sn_2H^+	Sn_2H_6	$2H_2 + H$	10.6 ± 0.3	LE	257	2133
		$Sn_2H_2^+$				
$Sn_2H_2^+$	Sn_2H_6	$2H_2$	10.5 ± 0.3	LE	307	2133
		$Sn_2H_3^+$				
$Sn_2H_3^+$	Sn_2H_6	$H_2 + H$	10.4 ± 0.3	LE	252	2133
		$Sn_2H_4^+$				
$Sn_2H_4^+$	Sn_2H_6	H_2	10.3 ± 0.3	LE	302	2133
		$Sn_2H_5^+$				
$Sn_2H_5^+$	Sn_2H_6	H	10.0 ± 0.3	LE	243	2133

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$Sn_2H_6^+$				
$Sn_2H_6^+$	Sn_2H_6		9.0 ± 0.3	LE	272	2133
		SnO^+				
SnO^+	SnO		10.5 ± 0.5	NS	246	1243, 1244
		Sn_2O^+				
Sn_2O^+	Sn_2O_2	O?	13.8 ± 0.5	NS	199	1243
Sn_2O^+	Sn_2O_2	O?	14.0	NS	203	1244
		$Sn_2O_2^+$				
$Sn_2O_2^+$	Sn_2O_2		9.8 ± 0.5	NS	166	1243, 1244
		$Sn_3O_3^+$				
$Sn_3O_3^+$	Sn_3O_3		9.8 ± 0.5	NS	100	1243, 1244
		$Sn_4O_4^+$				
$Sn_4O_4^+$	Sn_4O_4		9.2 ± 0.5	NS	19	1243, 1244
		SnS^+				
SnS^+	SnS		9.7 ± 0.5	LE	252	2139
		Sn_2S^+				
Sn_2S^+	Sn_2S_2	S	12.4 ± 1.0	LE	228	2139
		$Sn_2S_2^+$				
$Sn_2S_2^+$	Sn_2S_2		9.4 ± 0.5	LE	225	2139
		$SnSe^+$				
$SnSe^+$	SnSe		9.7 ± 0.5	LE	254	2063
		$Sn_2Se_2^+$				
$Sn_2Se_2^+$	Sn_2Se_2		9.8 ± 0.5	LE	241	2063
		CH_3Sn^+				
CH_3Sn^+	$(CH_3)_4Sn$	$3CH_3$	15.7 ± 0.4	EVD	258	82
		$C_2H_6Sn^+$				
$C_2H_6Sn^+$	$(CH_3)_4Sn$	$2CH_3$	13.1 ± 0.2	EVD	231	82
		$C_3H_9Sn^+$ Heat of formation 186 kcal mol^{-1}				
$C_3H_9Sn^+$	$(CH_3)_4Sn$	CH_3	9.72 ± 0.06	RPD	186*	1424
$C_3H_9Sn^+$	$(CH_3)_4Sn$	CH_3	9.9 ± 0.15	EVD	191	82
$C_3H_9Sn^+$	$(CH_3)_3SnC_2H_5$	C_2H_5	9.47 ± 0.15	RPD	186*	1424
$C_3H_9Sn^+$	n-$C_3H_7Sn(CH_3)_3$	n-C_3H_7	9.50 ± 0.12	RPD	185*	1424
$C_3H_9Sn^+$	$(CH_3)_3SnSn(CH_3)_3$	$(CH_3)_3Sn$	9.84 ± 0.09	RPD	(b)	1424

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TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_4H_{12}Sn^+$				
$C_4H_{12}Sn^+$	$(CH_3)_4Sn$		8.25 ± 0.15	EVD	186*	82
$C_4H_{12}Sn^+$	$(CH_3)_4Sn$		8.4	EC	189	218
		Sb^+ Heat of formation 262 kcal mol^{-1}				
Sb^+	Sb		8.641	S	262*	2113
Sb^+	Sb		8.6 ± 0.3	LE	261	2138
Sb^+	Sb_2	Sb	11.5 ± 0.3	LE	259	2138
Sb^+	Sb_4	$Sb_2 + Sb$?	15 ± 0.5	LE	276	2138
Sb^+	SbH_3	$H_2 + H$	12.1 ± 0.2	LE	262	2116
Sb^+	SbH_3	3H	16.7 ± 0.3	LE	264	2116
Sb^+	Sb_2H_4	$Sb + 2H_2$	11.5 ± 0.3	LE	(a)	2133
		Sb_2^+				
Sb_2^+	Sb_2		8.4 ± 0.3	LE	250	2138
Sb_2^+	Sb_4	Sb_2	11.4 ± 0.3	LE	256	2138
Sb_2^+	Sb_2H_4	$2H_2$	11.2 ± 0.3	LE	318	2133
		Sb_3^+				
Sb_3^+	Sb_4	Sb	10.8 ± 0.3	LE	235	2138
		Sb_4^+				
Sb_4^+	Sb_4		7.7 ± 0.3	LE	227	2138
		SbH^+				
SbH^+	SbH_3	H_2	9.9 ± 0.2	LE	263	2116
SbH^+	SbH_3	2H	14.2 ± 0.2	LE	258	2116
		SbH_2^+				
SbH_2^+	SbH_3	H	11.8 ± 0.3	LE	255	2116
		SbH_3^+				
SbH_3^+	SbH_3		9.58	PI	256*	1091
SbH_3^+	SbH_3		9.9 ± 0.3	LE	263	2116
		Sb_2H^+				
Sb_2H^+	Sb_2H_4	$H_2 + H$	10.9 ± 0.3	LE	259	2133
		$Sb_2H_2^+$				
$Sb_2H_2^+$	Sb_2H_4	H_2	10.7 ± 0.3	LE	306	2133
		$Sb_2H_3^+$				
$Sb_2H_3^+$	Sb_2H_4	H	10.5 ± 0.3	LE	250	2133
		$Sb_2H_4^+$				
$Sb_2H_4^+$	Sb_2H_4		10.2 ± 0.3	LE	295	2133

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$InSb^+$				
$InSb^+$	$InSb_2$	Sb	8.4 ± 0.3	LE	206	2138
		$InSb_2^+$				
$InSb_2^+$	$InSb_2$		6.6 ± 0.4	LE	227	2138
		$C_{18}H_{15}Sb^+$				
$C_{18}H_{15}Sb^+$ (Triphenylstilbene)	$(C_6H_5)_3Sb$		7.3 ± 0.1	PI	255*	1140
		Te^+ Heat of formation 255 kcal mol^{-1}				
Te^+	Te		9.009	S	255*	2113
Te^+	Te		9.5 ± 1.0	LE	266	2063
Te^+	GeTe	Ge	13.3 ± 0.5	NS	259	1023
Te^+	SnTe	Sn	12.1 ± 1.0	LE	245	2063
		Te_2^+				
Te_2^+	Te_2		8.4 ± 0.6	NS	234	1023
		$GeTe^+$				
$GeTe^+$	GeTe		10.1 ± 0.5	NS	275	1023
		$GeTe_2^+$				
$GeTe_2^+$	$GeTe_2$		10.8 ± 0.5	NS	293	1023
		$SnTe^+$				
$SnTe^+$	SnTe		9.1 ± 0.5	LE	248	2063
		I^+ Heat of formation 267 kcal mol^{-1}				
I^+	I		10.457	S	267*	2113
I^+	I_2	I^-	8.62 ± 0.06	RPD	261	292, 288
I^+	I_2	I	12.02 ± 0.04	RPD	267	292
I^+	I_2	I	12.72 ± 0.04	RPD		292
I^+	I_2	I	13.71 ± 0.06	RPD		292
I^+	LiI	Li	14.4 ± 0.3	VC	275	2001
I^+	NaI	Na	14.4 ± 0.3	VC		2001
I^+	KI	K	14.6 ± 0.3	VC		2001
I^+	RbI	Rb	14.4 ± 0.3	VC		2001
I^+	CH_3I	CH_3^-?	11.8 ± 0.05	RPD		2154
I^+	CH_3I	CH_3	12.9 ± 0.05	RPD	267	2154
I^+	CH_3I	CH_3	13.6 ± 0.05	RPD		2154
I^+	CH_3I	CH_3	14.4 ± 0.05	RPD		2154
I^+	C_2H_5I	$C_2H_3 + H_2$	14.8 ± 0.2	VC	274	356
I^+	CNI	CN^-	9.8 ± 0.1	SL		73
I^+	CNI	CN	14.3 ± 0.1	SL	284	73
I^+	CF_3I	CF_3^-?	10.6 ± 0.2	LE		439
I^+	CF_3I	CF_3	13.25 ± 0.07	EVD	279	439
I^+	CF_3I	CF_3	13.4 ± 0.1	MSD	282	1111
I^+	CF_3I	CF_3	13.6 ± 0.5	SL	287	24
I^+	CF_3I	$CF_2 + F$?	16.4 ± 0.2	LE	253	439
I^+	CsI	Cs	14.1 ± 0.3	VC	264	2001
I^+	TlI	Tl	13.4 ± 0.1	RPD	267	2159

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$I_2^+(^2\Pi_{3/2g})$ Heat of formation 229 kcal mol^{-1}				
		$I_2^+(^2\Pi_{1/2g})$ 246 kcal mol^{-1}				
		$I_2^+(^2\Pi_{3/2u})$ 266 kcal mol^{-1}				
$I_2^+(^2\Pi_{3/2g})$	I_2		9.28 ± 0.02	PI	229*	182, 416
$I_2^+(^2\Pi_{3/2g})$	I_2		9.3 ± 0.1	PI	229*	213
$I_2^+(^2\Pi_{3/2g})$	I_2		9.35 ± 0.03	RPD	231	288, 292
$I_2^+(^2\Pi_{1/2g})$	I_2		10.0 ± 0.1	PI	246*	213
$I_2^+(^2\Pi_{1/2g})$	I_2		9.97 ± 0.02	RPD	245	288, 292
$I_2^+(^2\Pi_{3/2u})$	I_2		10.9 ± 0.1	PI	266*	213
$I_2^+(^2\Pi_{3/2u})$	I_2		10.91 ± 0.04	RPD	267	288, 292
$I_2^+(^2\Pi_{1/2u})$	I_2		11.72 ± 0.04	RPD	285	288, 292
$I_2^+(^2\Sigma_g^+)$	I_2		13.64 ± 0.06	RPD	329	288, 292
		$HI^+(^2\Pi_{3/2})$ Heat of formation 246 kcal mol^{-1}				
$HI^+(^2\Pi_{3/2})$	HI		10.38 ± 0.02	PI	246*	182, 416
$HI^+(^2\Pi_{3/2})$	HI		10.4 ± 0.1	PI	246*	213
$HI^+(^2\Pi_{3/2})$	HI		10.44 ± 0.04	RPD	247	463
$HI^+(^2\Pi_{1/2})$	HI		11.14 ± 0.04	RPD	263	463
$HI^+(^2\Sigma)$	HI		13.27 ± 0.10	RPD	312	463
HI^+	HI		10.4 ± 0.1	VC	246	2001
HI^+	HI		10.5 ± 0.1	VC	248	2001
HI^+	C_2H_5I	C_2H_4	11.7 ± 0.1	VC	255	356
		HI^{+2}				
HI^{+2}	HI		30.0 ± 0.5	FDP	698	212
		LiI^+				
LiI^+	LiI		8.6 ± 0.3	VC	179	2001
		Li_2I^+				
Li_2I^+	Li_2I_2	I	9.2 ± 0.3	VC	105	2001
		$Li_3I_2^+$				
$Li_3I_2^+$	Li_3I_3	I	9.2 ± 0.3	VC		2001
		BI^+				
BI^+	BI_3	2I	14.4 ± 0.2	VC	298	206
BI^+	BI_3	2I	14.6 ± 0.2	VC	303	206
		BI_2^+				
BI_2^+	BI_3	I	9.7 ± 0.2	VC	215	206
BI_2^+	BI_3	I	10.1 ± 0.2	VC	224	206
		BI_3^+				
BI_3^+	BI_3		9.0 ± 0.2	VC	225	206
		CI^+				
CI^+	CNI	N	17.6 ± 0.3	SL	347	73

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		IF^+				
IF^+	IF		10.5 ± 0.3	VC	219	357
IF^+	IF_5		24	VC		357
		IF_2^+				
IF_2^+	IF_5	$2F + F^-$?	15.1 ± 0.3	VC	179	357
		IF_3^+				
IF_3^+	IF_5	$F + F^-$?	11.5 ± 0.3	VC	114	357
		IF_4^+				
IF_4^+	IF_5	F^-?	13.6 ± 0.3	VC	182	357
		IF_5^+				
IF_5^+	IF_5		13.5 ± 0.2	VC	115	357
IF_5^+	IF_5		21.8	VC		357
		NaI^+				
NaI^+	NaI		8.7 ± 0.3	VC		2001
		Na_2I^+				
Na_2I^+	Na_2I_2	I	9.1 ± 0.3	VC		2001
		$Na_3I_2^+$				
$Na_3I_2^+$	Na_3I_3	I	8.6 ± 0.3	VC		2001
		MgI^+				
MgI^+	MgI_2	I	11.5 ± 0.5	VC	199	178
		MgI_2^+				
MgI_2^+	MgI_2		10.0 ± 0.5	VC	190	178
		$Mg_2I_3^+$				
$Mg_2I_3^+$	Mg_2I_4	I	10.0 ± 0.4	VC	92	178
		$ICl^+(^2\Pi_{3/2g})$ Heat of formation 242 kcal mol^{-1}				
$ICl^+(^2\Pi_{3/2g})$	ICl		10.31 ± 0.02	RPD	242*	292
ICl^+	ICl		10.4 ± 0.2	VC	244	357
$ICl^+(^2\Pi_{1/2g})$	ICl		10.79 ± 0.03	RPD	253	292
$ICl^+(^2\Pi_{3/2u})$	ICl		12.13 ± 0.04	RPD	284	292
		KI^+				
KI^+	KI		8.2 ± 0.3	VC		2001
		K_2I^+				
K_2I^+	K_2I_2	I	8.2 ± 0.3	VC		2001

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
$IBr^+(^2\Pi_{3/2g})$ Heat of formation 240 kcal mol^{-1}						
$IBr^+(^2\Pi_{3/2g})$	IBr		9.98 ± 0.03	RPD	240*	292
IBr^+	IBr		10.3 ± 0.2	VC	247	357
$IBr^+(^2\Pi_{1/2g})$	IBr		10.49 ± 0.03	RPD	252	292
$IBr^+(^2\Pi_{3/2u})$	IBr		11.59 ± 0.05	RPD	277	292
RbI^+						
RbI^+	RbI		8.0 ± 0.3	VC		2001
Rb_2I^+						
Rb_2I^+	Rb_2I_2	I	8.2 ± 0.3	VC		2001
$B_5H_8I^+$						
$B_5H_8I^+$	B_5H_8I		11.1 ± 0.5	SL		103
$B_5H_8I^+$	B_5H_8I		9.2 ± 0.1	EVD		1102
CH_2I^+						
CH_2I^+	CH_3I	H	12.08 ± 0.09	RPD	230	1139
CH_2I^+	CH_3I	H	13.7	RPD	267	160
CH_2I^+	CH_3I	H	15.0	RPD		160
CH_2I^+	CH_3I	H	13.1 ± 0.2	VC	253	356
CH_2I^+	C_2H_5I	CH_3	13.7 ± 0.3	VC	281	356
CH_2I^+	CH_3I	H⁻?	13.0	RPD	270	160
CH_2I^+	CH_3I	H⁻?	14.3	RPD		160
$CH_3I^+(^2E_{1/2})$ Heat of formation 223 kcal mol^{-1}						
$CH_3I^+(^2E_{3/2})$ 237 kcal mol^{-1}						
$CH_3I^+(^2E_{1/2})$	CH_3I		9.538 ± 0.003	S	223*	2064
$CH_3I^+(^2E_{1/2})$	CH_3I		9.54 ± 0.01	PI	223*	182, 416
$CH_3I^+(^2E_{1/2})$	CH_3I		9.550 ± 0.006	PI	223*	1253
$CH_3I^+(^2E_{1/2})$	CH_3I		9.55 ± 0.1	PI	223*	213
$CH_3I^+(^2E_{1/2})$	CH_3I		9.51 ± 0.02	RPD	222	289
$CH_3I^+(^2E_{3/2})$	CH_3I		10.165 ± 0.003	S	238*	2064
$CH_3I^+(^2E_{3/2})$	CH_3I		10.12 ± 0.03	PI	236*	1253
$CH_3I^+(^2E_{3/2})$	CH_3I		10.15 ± 0.1	PI	237*	213
$CH_3I^+(^2E_{3/2})$	CH_3I		10.0 ± 0.05	RPD	234	2154
$CH_3I^+(^2E_{3/2})$	CH_3I		10.09 ± 0.04	RPD	236	289
CH_3I^+	CH_3I		11.2 ± 0.05	RPD		2154
CH_3I^+	CH_3I		11.22 ± 0.06	RPD		289
CH_3I^+	CH_3I		13.1 ± 0.05	RPD		2154
CH_3I^+	CH_3I		13.14 ± 0.05	RPD		289
CH_3I^+	CH_3I		19.76 ± 0.2	RPD		289

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_2H_5I^+(^2E_{1/2})$ Heat of formation 213 kcal mol^{-1}				
		$C_2H_5I^+(^2E_{3/2})$ 227 kcal mol^{-1}				
$C_2H_5I^+(^2E_{1/2})$	C_2H_5I		9.346 ± 0.005	S	214*	2065
$C_2H_5I^+(^2E_{1/2})$	C_2H_5I		9.33 ± 0.01	PI	213*	182, 416
$C_2H_5I^+(^2E_{1/2})$	C_2H_5I		9.35 ± 0.02	RPD	214	224
$C_2H_5I^+$	C_2H_5I		9.6 ± 0.2	VC	220	356
$C_2H_5I^+(^2E_{3/2})$	C_2H_5I		9.928 ± 0.005	S	227*	2065
$C_2H_5I^+(^2E_{3/2})$	C_2H_5I		9.85 ± 0.1	RPD	225	224
$C_2H_5I^+(^2E_{3/2})$	C_2H_5I		9.85	RPD	225	160
$C_2H_5I^+$	C_2H_5I		10.60 ± 0.1	RPD		224
$C_2H_5I^+$	C_2H_5I		10.6	RPD		160
$C_2H_5I^+$	C_2H_5I		10.6	TC		2038
$C_2H_5I^+$	C_2H_5I		12.1	RPD		160
$C_2H_5I^+$	C_2H_5I		12.2	TC		2038
$C_2H_5I^+$	C_2H_5I		13.0	RPD		160
$C_2H_5I^+$	C_2H_5I		13.2	TC		2038
		***n*-$C_3H_7I^+(^2E_{1/2})$ Heat of formation 208 kcal mol^{-1}**				
		***iso*-$C_3H_7I^+(^2E_{1/2})$ 201 kcal mol^{-1}**				
$C_3H_7I^+(^2E_{1,2})$	*n*-C_3H_7I		9.26 ± 0.01	PI	208*	182
$C_3H_7I^+(^2E_{3,2})$	*n*-C_3H_7I		9.85	RPD	221	160
$C_3H_7I^+$	*n*-C_3H_7I		10.4	RPD		160
$C_3H_7I^+$	*n*-C_3H_7I		10.4	TC		2038
$C_3H_7I^+$	*n*-C_3H_7I		11.4	RPD		160
$C_3H_7I^+$	*n*-C_3H_7I		11.6	TC		2038
$C_3H_7I^+$	*n*-C_3H_7I		12.2	RPD		160
$C_3H_7I^+$	*n*-C_3H_7I		12.4	TC		2038
$C_3H_7I^+$	*n*-C_3H_7I		13.0	RPD		160
$C_3H_7I^+$	*n*-C_3H_7I		13.2	TC		2038
$C_3H_7I^+(^2E_{1,2})$	*iso*-C_3H_7I		9.17 ± 0.02	PI	201*	182
$C_3H_7I^+$	*iso*-C_3H_7I		10.5	TC		2038
$C_3H_7I^+$	*iso*-C_3H_7I		11.0	TC		2038
$C_3H_7I^+$	*iso*-C_3H_7I		12.8	TC		2038
$C_3H_7I^+$	*iso*-C_3H_7I		13.2	TC		2038
		$C_4H_9I^+$				
$C_4H_9I^+$	*n*-C_4H_9I		9.21 ± 0.01	PI	202*	182
$C_4H_9I^+$	*sec*-C_4H_9I		9.09 ± 0.02	PI	198*	182
$C_4H_9I^+$	*iso*-C_4H_9I		9.18 ± 0.02	PI	200*	182
$C_4H_9I^+$	*tert*-C_4H_9I		9.02 ± 0.03	PI	193*	182
		$C_5H_{11}I^+$				
$C_5H_{11}I^+$	*n*-$C_5H_{11}I$		9.19 ± 0.01	PI	197*	182, 416
		$C_6H_5I^+$				
$C_6H_5I^+$ (Iodobenzene)	C_6H_5I		8.73 ± 0.03	PI	238*	182, 416
		$C_7H_7I^+$				
$C_7H_7I^+$ (*o*-Iodotoluene)	$C_6H_4ICH_3$		8.62 ± 0.01	PI	228*	182
$C_7H_7I^+$ (*m*-Iodotoluene)	$C_6H_4ICH_3$		8.61 ± 0.03	PI	226*	182
$C_7H_7I^+$ (*p*-Iodotoluene)	$C_6H_4ICH_3$		8.50 ± 0.01	PI	224*	182

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CNI^+				
CNI^+	CNI		10.98 ± 0.05	SL	307*	73
		CF_2I^+				
CF_2I^+	CF_3I	F	14.58 ± 0.06	EVD	176	439
CF_2I^+	CF_3I	F	15.3 ± 0.3	SL	193	24
		CF_3I^+				
CF_3I^+	CF_3I		10.64 ± 0.02	EVD	104	439
CF_3I^+	CF_3I		10.0 ± 0.3	SL	90	24
CF_3I^+	CF_3I		10.5 ± 0.1	MSD	101	1111
		$C_6F_5I^+$				
$C_6F_5I^+$ (Iodopentafluorobenzene)	C_6F_5I		9.5 ± 0.1	SL		301
		$C_3F_7I^+$				
$C_3F_7I^+$	*n*-C_3F_7I		10.36 ± 0.01	PI		182
		$LiNaI^+$				
$LiNaI^+$	$LiNaI_2$	I	9.0 ± 0.3	VC		2001
		$LiKI^+$				
$LiKI^+$	$LiKI_2$	I	9.0 ± 0.3	VC		2001
		$LiRbI^+$				
$LiRbI^+$	$LiRbI_2$	I	8.4 ± 0.3	VC		2001
		$C_8H_{10}NI^+$				
$C_8H_{10}NI^+$ (*N*,*N*-Dimethyl-*p*-iodoaniline)	$C_6H_4IN(CH_3)_2$		7.29	CTS	205	1281
		$C_2H_2F_3I^+$				
$C_2H_2F_3I^+$	CF_3CH_2I		10.00 ± 0.01	PI		182
		$C_4H_2F_7I^+$				
$C_4H_2F_7I^+$	*n*-$C_3F_7CH_2I$		9.96 ± 0.02	PI		182
		$C_6H_4ClI^+$				
$C_6H_4ClI^+$ (*o*-Chloroiodobenzene)	C_6H_4ClI		8.35 ± 0.1	PI	222*	416
		Cs^+ Heat of formation 109 kcal mol^{-1}				
Cs^+	Cs		3.894	S	109*	2113
Cs^+	CsCl	Cl	11.9 ± 0.2	LE	183	2056
Cs^+	CsI	I	8.3 ± 0.3	VC	124	2001
Cs^+	CsI	I	7.3 ± 1	NS	101	1239

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CsI^+				
CsI^+	CsI		7.9±0.3	VC	140	2001
CsI^+	CsI		7.3±1	NS	126	1239
		Cs_2I^+				
Cs_2I^+	Cs_2I_2	I	8.1±0.3	VC	40	2001
Cs_2I^+	Cs_2I_2	I	10.7±1	NS	100	1239
		$CsCdCl^+$				
$CsCdCl^+$	$CsCdCl_3$	2Cl	10.5±0.2	LE		2056
		$LiCsI^+$				
$LiCsI^+$	$LiCsI_2$	I	8.6±0.3	VC		2001
		Ba^+ Heat of formation 162 kcal mol^{-1}				
Ba^+	Ba		5.211	S	162*	2113
Ba^+	Ba		5.2±0.1	NS	162	2178
Ba^+	BaO	O	13.2±0.2	NS	200	2178
Ba^+	BaI_2	2I?	12.8±1	NS	160	1239
		Ba^{+2} Heat of formation 393 kcal mol^{-1}				
Ba^{+2}	Ba		15.215	S	393*	2113
Ba^{+2}	Ba		11.5±0.3	NS	307	2178
Ba^{+2}	BaO	O	20.6±0.5	NS	371	2178
		Ba^{+3}				
Ba^{+3}	Ba		57.5	NS	1368	2178
		BaO^+				
BaO^+	BaO		6.5±0.3	NS	105	2178
BaO^+	BaO		7±1	NS	117	2052
		BaF^+				
BaF^+	BaF		4.9±0.3	NS	104	1104
		BaI^+				
BaI^+	BaI_2	I	9.6±1	NS	112	1239
		BaI_2^+				
BaI_2^+	BaI_2		8.1±1	NS	103	1239
		$BaOH^+$				
$BaOH^+$	BaOH		4.5±1	NS	35	2052
		La^+ Heat of formation 232 kcal mol^{-1}				
La^+	La		5.615±0.03	S	232*	2113
La^+	LaF_3	3F?	26.5	VC	228	2009

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		LaF^+				
LaF^+	LaF_3	2F	18.5	VC	63	2009
		LaF_2^+				
LaF_2^+	LaF_3	F	12.0	VC	−68	2009
		Nd^+ Heat of formation 206 kcal mol^{-1}				
Nd^+	Nd		5.46	S	204*	2177
Nd^+	Nd		5.62	S	208*	2177
		Sm^+				
Sm^+	Sm		5.70 ± 0.02	SI	180*	1165
		Eu^+				
Eu^+	Eu		5.68 ± 0.03	SI	173*	1165
		Dy^+				
Dy^+	Dy		5.80 ± 0.02	SI	205*	1165
		Ho^+				
Ho^+	Ho		6.19 ± 0.02	SI	213*	1165
		Er^+				
Er^+	Er		6.3 ± 0.1	S	227*	1286
		Tm^+ Heat of formation 203 kcal mol^{-1}				
Tm^+	Tm		5.81 ± 0.02	S	193	2186
Tm^+	Tm		6.22 ± 0.02	S	203*	1448
Tm^+	Tm		6.51 ± 0.08	S	209	1286
Tm^+	Tm		6.15 ± 0.02	SI	201	1165
		Lu^+				
Lu^+	Lu		5.41 ± 0.02	SI	227*	1165
		TaO^+				
TaO^+	TaO		6 ± 0.5	VC	200	2050
		TaO_2^+				
TaO_2^+	TaO_2		9 ± 0.5	VC	164	2050
		W^+ Heat of formation 387 kcal mol^{-1}				
W^+	W		7.98	S	387*	2113
W^+	$W(CO)_6$	6CO	22.9 ± 0.6	EVD	478	1107
W^+	$W(CO)_6$	6CO	20.6 ± 0.2	CS	425	2023
		WC^+				
WC^+	$W(CO)_6$	CO_2 + 4CO?	28.8 ± 0.5	EVD	656	1107

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		WO^+				
WO^+	WO		9.1 ± 1	LE	318	2126
		WO_2^+				
WO_2^+	WO_2		9.8	LE	237	1244, 2123
WO_2^+	WO_2		9.9 ± 0.6	LE	239	2126
WO_2^+	WO_3	O	14.2	VC	197	2131
		WO_3^+				
WO_3^+	WO_3		11.7 ± 0.6	LE	199	2126
WO_3^+	WO_3		11.9	LE	203	1244, 2123
WO_3^+	WO_3		12.1	VC	208	2131
		$W_2O_5^+$				
$W_2O_5^+$	W_2O_6	O	15.8	VC	28	2131
		$W_2O_6^+$				
$W_2O_6^+$	W_2O_6		13.4	VC	32	2131
		$W_3O_8^+$				
$W_3O_8^+$	W_3O_9	O	15.5	VC	−170	2131
		$W_3O_9^+$				
$W_3O_9^+$	W_3O_9		13.3	VC	−161	2131
		WCO^+				
WCO^+	$W(CO)_6$	5CO	20.2 ± 0.3	EVD	390	1107
WCO^+	$W(CO)_6$	5CO	18.5 ± 0.16	CS	350	2023
		WC_2O^+				
WC_2O^+	$W(CO)_6$	$CO_2 + 3CO$?	25.9 ± 0.6	EVD	562	1107
		$WC_2O_2^+$				
$WC_2O_2^+$	$W(CO)_6$	4CO	17.6 ± 0.2	EVD	303	1017
$WC_2O_2^+$	$W(CO)_6$	4CO	16.07 ± 0.04	CS	268	2023
		$WC_3O_3^+$				
$WC_3O_3^+$	$W(CO)_6$	3CO	14.9 ± 0.2	EVD	215	1107
$WC_3O_3^+$	$W(CO)_6$	3CO	13.60 ± 0.02	CS	185	2023
		$WC_4O_4^+$				
$WC_4O_4^+$	$W(CO)_6$	2CO	12.7 ± 0.2	EVD	137	1107
$WC_4O_4^+$	$W(CO)_6$	2CO	11.82 ± 0.02	CS	117	2023
		$WC_5O_5^+$				
$WC_5O_5^+$	$W(CO)_6$	CO	9.80 ± 0.17	EVD	44	1107
$WC_5O_5^+$	$W(CO)_6$	CO	9.97 ± 0.04	CS	48	2023

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$WC_6O_6^+$				
$WC_6O_6^+$	$W(CO)_6$		8.18 ± 0.03	PI	−20*	1167
$WC_6O_6^+$	$W(CO)_6$		8.56 ± 0.13	EVD	−11	1107
$WC_6O_6^+$	$W(CO)_6$		8.46 ± 0.02	CS	−13	2023
		$CaWO_3^+$				
$CaWO_3^+$	$CaWO_3$		6.7	LE	38	1244
		$CaWO_4^+$				
$CaWO_4^+$	$CaWO_4$		9.8	LE	3	1244
		$SrWO_3^+$				
$SrWO_3^+$	$SrWO_3$		6.4	LE	4	1244
		$SrWO_4^+$				
$SrWO_4^+$	$SrWO_4$		9.4	LE	−34	1244
		$SnWO_4^+$				
$SnWO_4^+$	$SnWO_4$		10.8	LE	57	1244
		$Sn_2WO_5^+$				
$Sn_2WO_5^+$	Sn_2WO_5		8.4	LE	−58	1244
		$ReCl_3^+$				
$ReCl_3^+$	Re_3Cl_9	Re_2Cl_6?	16 ± 0.5	VC		2140
		$ReCl_4^+$				
$ReCl_4^+$	Re_3Cl_9	Re_2Cl_5?	16 ± 0.5	VC		2140
		$Re_2Cl_5^+$				
$Re_2Cl_5^+$	Re_3Cl_9	$ReCl_3 + Cl$	$13.5 + 0.5$	VC		2140
		$Re_2Cl_6^+$				
$Re_2Cl_6^+$	Re_3Cl_9	$ReCl_3$?	13.5 ± 0.5	VC		2140
		$Re_3Cl_8^+$				
$Re_3Cl_8^+$	Re_3Cl_9	Cl	13 ± 0.5	VC	131	2140
		$Re_3Cl_9^+$				
$Re_3Cl_9^+$	Re_3Cl_9		10.5 ± 0.5	VC	102	2140
		Os^+ Heat of formation 390 kcal mol^{-1}				
Os^+	Os		8.7	S	390*	2113
Os^+	OsO_4	$O_2 + 2O$?	26.8 ± 0.5	EVD	418	1284

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		OsO^+				
OsO^+	OsO_4	O_2+O?	21.2±0.2	EVD	349	1284
		OsO_2^+				
OsO_2^+	OsO_4	O_2	17.1±0.2	EVD	314	1284
		OsO_3^+				
OsO_3^+	OsO_3		12.3±1	LE	216	2127
OsO_3^+	OsO_4	O	17.00±0.10	EVD	252	1284
		OsO_4^+				
OsO_4^+	OsO_4		12.97±0.12	EVD	219*	1284
OsO_4^+	OsO_4		12.6±1	LE	210	2127
		Ir^+				
Ir^+	Ir		9	S	367	2113
Ir^+	Ir		9.6	NS	380	1124
Ir^+	IrO_2	O_2	13.1	NS	351	1124
		IrO^+				
IrO^+	IrO		10.1	NS	337	1124
IrO^+	IrO_2	O	15.1	NS	337	1124
		IrO_2^+				
IrO_2^+	IrO_2		10.9	NS	300	1124
		IrO_3^+				
IrO_3^+	IrO_3		11.9	NS	276	1124
		Hg^+ Heat of formation 255 kcal mol^{-1}				
Hg^+	Hg		10.44	S	255*	2113
		Hg^{+2} Heat of formation 688 kcal mol^{-1}				
Hg^{+2}	Hg		29.19	S	688*	2113
Hg^{+2}	Hg		29.8	VC	702	211
Hg^{+2}	Hg		29.0±0.2	NRE	683	211
		Hg^{+3} Heat of formation 1477 kcal mol^{-1}				
Hg^{+3}	Hg		63.4	S	1477*	2113
Hg^{+3}	Hg		68.5	VC	1594	211
Hg^{+3}	Hg		63.5±0.5	NRE	1479	211
		Hg^{+4}				
Hg^{+4}	Hg		122.5	VC	2840	211
Hg^{+4}	Hg		113±1	NRE	2621	211

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		Hg^{+5}				
Hg^{+5}	Hg		175	VC	4050	211
Hg^{+5}	Hg		158 ± 2	NRE	3658	211
		Hg^{+6}				
Hg^{+6}	Hg		300	VC	6933	211
Hg^{+6}	Hg		225 ± 10	NRE	5203	211
		CH_3Hg^+				
CH_3Hg^+	$(CH_3)_2Hg$	CH_3	10.4 ± 0.2	EVD	233	83
CH_3Hg^+	$(CH_3)_2Hg$	CH_3	10.5 ± 0.1	SL	235	306
CH_3Hg^+	CH_3HgCl	Cl	12.35 ± 0.2	SL	244	306
		$C_2H_5Hg^+$				
$C_2H_5Hg^+$	$(C_2H_5)_2Hg$	C_2H_5	9.65 ± 0.1	SL	223	306
		$C_2H_6Hg^+$ Heat of formation 233 kcal mol^{-1}				
$C_2H_6Hg^+$	$(CH_3)_2Hg$		8.90 ± 0.2	EVD	231*	83
$C_2H_6Hg^+$	$(CH_3)_2Hg$		9.1 ± 0.1	SL	236*	306
		$C_3H_7Hg^+$				
$C_3H_7Hg^+$	$(iso\text{-}C_3H_7)_2Hg$	$iso\text{-}C_3H_7$	9.1 ± 0.1	SL	206	306
		$C_4H_{10}Hg^+$				
$C_4H_{10}Hg^+$	$(C_2H_5)_2Hg$		8.5 ± 0.1	SL	221*	306
		$C_6H_{14}Hg^+$				
$C_6H_{14}Hg^+$	$(iso\text{-}C_3H_7)_2Hg$		7.6 ± 0.1	SL	188*	306
		CH_3HgCl^+				
CH_3HgCl^+	CH_3HgCl		11.5 ± 0.2	SL	253*	306
		Tl^+ Heat of formation 184 kcal mol^{-1}				
Tl^+	Tl		6.108	S	184*	2113
Tl^+	TlCl	Cl	10.0 ± 0.1	RPD	185	2159
Tl^+	TlBr	Br^-	5.95 ± 0.1	RPD	184	2159
Tl^+	TlI	I^-	6.0 ± 0.1	RPD	187	2159
		Pb^+ Heat of formation 218 kcal mol^{-1}				
Pb^+	Pb		7.417	S	218*	2113
Pb^+	Pb		7.3 ± 0.5	LE	215	1245
Pb^+	Pb		7.5 ± 0.5	LE	220	2139
Pb^+	PbH_4	$H_2 + 2H$	11.2	LE	(a)	2116
Pb^+	PbS	S	11.6 ± 0.5	LE	233	2139
Pb^+	$PbCl_2$	Cl_2	12.0 ± 0.2	LE	226	2056
Pb^+	$(CH_3)_4Pb$	$4CH_3$	15.0 ± 0.5	EVD	246	82

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		PbH^+				
PbH^+	PbH_4	3H	11.1	LE	163	2116
		PbH_2^+				
PbH_2^+	PbH_4	2H	10.1	LE	192	2116
		PbH_3^+				
PbH_3^+	PbH_4	H	9.6	LE	233	2116
		PbO^+				
PbO^+	PbO		9.0 ± 0.5	LE	225	1245
		Pb_2O^+				
Pb_2O^+	Pb_2O_2?	O?	11.9 ± 1.0	LE	186	1245
		$Pb_2O_2^+$				
$Pb_2O_2^+$	Pb_2O_2		8.8 ± 0.5	LE	174	1245
		$Pb_3O_2^+$				
$Pb_3O_2^+$	Pb_3O_3?	O?	14.6 ± 1.0	LE	202	1245
		$Pb_3O_3^+$				
$Pb_3O_3^+$	Pb_3O_3		9.7 ± 1.0	LE	149	1245
		$Pb_4O_4^+$				
$Pb_4O_4^+$	Pb_4O_4		8.5 ± 1.0	LE	62	1245
		PbS^+				
PbS^+	PbS		8.6 ± 0.5	LE	230	2139
		$Pb_2S_2^+$				
$Pb_2S_2^+$	Pb_2S_2		9.2 ± 0.5	LE	231	2139
		$PbCl^+$				
$PbCl^+$	$PbCl_2$	Cl	11.7 ± 0.2	LE	190	2056
		$PbCl_2^+$				
$PbCl_2^+$	$PbCl_2$		11.2 ± 0.2	LE	208	2056
		CH_3Pb^+				
CH_3Pb^+	$(CH_3)_4Pb$	$3CH_3$	12.4 ± 0.2	EVD	219	82
		$C_2H_6Pb^+$				
$C_2H_6Pb^+$	$(CH_3)_4Pb$	$2CH_3$	11.6 ± 0.2	EVD	234	82

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_9Pb^+$				
$C_3H_9Pb^+$	$(CH_3)_4Pb$	CH_3	8.9 ± 0.1	EVD	205	82
		$C_4H_{12}Pb^+$				
$C_4H_{12}Pb^+$	$(CH_3)_4Pb$		8.0 ± 0.4	EVD	217*	82
		$RbPbCl_2^+$				
$RbPbCl_2^+$	$RbPbCl_3$	Cl	11.6 ± 0.2	LE		2056
		$CsPbCl^+$				
$CsPbCl^+$	$CsPbCl_3$	2Cl	11.5 ± 0.2	LE		2056
		Bi^+ Heat of formation 218 kcal mol^{-1}				
Bi^+	Bi		7.289	S	218*	2113
Bi^+	Bi		8	NS	234	2049
Bi^+	BiH_3	3H	13.4	LE	(a)	2116
		Bi_2^+				
Bi_2^+	Bi_2		8	NS	237	2049
		BiH^+				
BiH^+	BiH_3	2H	12.2	LE	242	2116
		BiH_2^+				
BiH_2^+	BiH_3	H	12.4	LE	299	2116
		BiH_3^+				
BiH_3^+	BiH_3		10.1	LE	298	2116
		BiS^+				
BiS^+	BiS		8	NS	227	2049
		Bi_2S^+				
Bi_2S^+	Bi_2S_2	S	14	NS		2049
		$C_{18}H_{15}Bi^+$				
$C_{18}H_{15}Bi^+$ (Triphenylbismuth)	$(C_6H_5)_3Bi$		7.3 ± 0.1	PI	288*	1140
		At_2^+				
At_2^+	At_2		8.3	D		104

TABLE 1. Ionization Potentials, Appearance Potentials, and Heats of Formation of Gaseous Positive Ions—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		U^+ Heat of formation 266 kcal mol^{-1}				
U^+	U		6.11 ± 0.05	RPD	266*	16
U^+	U		6.08 ± 0.08	SI	265*	317
U^+	U		5.4 ± 0.3	LE	250	2126
U^+	U		4.9	VC	238	2054
U^+	UO	O	13.4	VC	255	2054
		UO^+				
UO^+	UO		5.72 ± 0.06	RPD	138	16
UO^+	UO		4.7 ± 0.6	LE	114	2126
UO^+	UO		4.2	VC	103	2054
		UO_2^+				
UO_2^+	UO_2		5.5 ± 0.1	RPD	31	16
UO_2^+	UO_2		4.3 ± 0.6	LE	3	2126
UO_2^+	UO_2		4.9	VC	17	2054
		UO_3^+				
UO_3^+	UO_3		10.4 ± 0.6	LE	51	2126
		Pu^+				
Pu^+	Pu		5.1 ± 0.5	SI		1149
		Am^+				
Am^+	Am		6.0	S		341

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4. TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1

This table lists heats of formation of neutral species derived from appearance potential measurements. Here (a) refers to a neutral reactant, and (b) to a neutral product. These quantities are listed for illustrative purposes and have not been evaluated.

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CH_2				
CH_2^+	CH_2		10.396 ± 0.003	S	93(a)	1078
CH_2^+	CH_2		11.82 ± 0.05	VC	60(a)	327
CH_2^+	CH_2		10.7 ± 0.5	NS	86(a)	87
(EI on neutral fragment from C_3H_8)						
CH_2^+	CH_2		11.0 ± 0.5	NS	79(a)	87
(EI on neutral fragment from n-C_4H_{10})						
		C_2H				
CH_3^+	$CH_3C{\equiv}CH$	C_2H	15.4 ± 0.5	VC	140(b)	13
$C_2H_5^+$	$C_2H_5C{\equiv}CH$	C_2H	12.9 ± 0.1	VC	118(b)	13
		C_3H_3				
CH_3^+	$CH_3CH{=}C{=}CH_2$	C_3H_3	14.4 ± 0.2	SL	112(b)	462
CH_3^+	$CH_3C{\equiv}CCH_3$	C_3H_3	17.6 ± 0.5	VC	182(b)	13
Cl^+	$CH_3C{\equiv}CCl$	C_3H_3	18.4 ± 0.5	VC	132(b)	13
Br^+	$CH_3C{\equiv}CBr$	C_3H_3	16.0 ± 0.5	VC	118(b)	13
$C_3H_3^+$	$C_2H_5C{\equiv}CC{\equiv}CH$	C_3H_3	12.20	EVD	120(b)	1197
$C_3H_3^+$	$CH_3C{\equiv}CCH_2C{\equiv}CH$	C_3H_3	12.05	EVD	117(b)	1197
$C_3H_3^+$	$CH_3C{\equiv}CC{\equiv}CCH_3$	C_3H_3	11.99	EVD	111(b)	1197
$C_3H_3^+$	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	C_3H_3	12.17	EVD	125(b)	1197
$C_3H_3^+$	C_6H_6	C_3H_3	15.17 ± 0.1	EVD	115(b)	1238
(Benzene)						
$C_3H_3^+$	C_6H_6	C_3H_3	16	EVD	135(b)	1197
(Benzene)						
$C_3H_3^+$	C_8H_8	$C_3H_3 + C_2H_2$	11.14 ± 0.18	EVD	96(b)	2105
(Cubane)						
		C_3H_5				
$C_3H_5^+$	$CH_2{=}CHCH_2$		8.15 ± 0.03	SL	28(a)	2114
$C_3H_5^+$	C_3H_5		8.05 ± 0.1	SL	53(a)	123
(Cyclopropyl radical)						
		C_4H_2				
$C_6H_6^+$	$C_{10}H_8$	C_4H_2	15.20 ± 0.05	SL	150(b)	2112
(Naphthalene)						
$C_6H_6^+$	$C_{10}H_8$	C_4H_2	13.86 ± 0.05	SL	159(b)	2112
(Azulene)						

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1 – *Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_4H_7				
C_4H^+	$CH_3CH{=}CHCH_2$		7.71 ± 0.05	EVD	23(a)	108
C_4H	$CH_2{=}C(CH_3)CH_2$		8.03 ± 0.05	EVD	20(a)	108
$C_4H_7^+$ (Cyclobutyl radical)	C_4H_7		7.88 ± 0.05	SL	31(a)	123
		C_4H_9				
$C_4H_9^+$	*tert*-C_4H_9		7.42 ± 0.07	SL	0(a)	141, 145
		C_5H_5				
$C_6H_5^+$ (Diphenyl carbonate)	$(C_6H_5)_2CO_3$	$C_5H_5 + CO + CO_2$	12.1 ± 0.1	SL	28(b)	1237
		C_5H_9				
$C_5H_9^+$ (Cyclopentyl radical)	C_5H_9		7.79 ± 0.03	SL	14(a)	123
		C_5H_{11}				
$C_5H_{11}^+$	n-$C_3H_7CHCH_3$		7.73 ± 0.1	EVD	5(a)	151
$C_5H_{11}^+$	$(C_2H_5)_2CH$		7.86 ± 0.05	EVD	7(a)	151
$C_5H_{11}^+$	*tert*-C_5H_{11}		7.12 ± 0.1	EVD	0(a)	151
		C_6H_4				
$C_6H_6O^+$ (Phenyl ether)	$(C_6H_5)_2O$	C_6H_4	13.88 ± 0.15	SL	164(b)	1237
		C_6H_5				
$C_2H_5^+$ (Phenyl ethyl sulfide)	$C_6H_5SC_2H_5$	$C_6H_5 + S$	13.7	SL	49(b)	307
		C_6H_{11}				
$C_6H_{11}^+$ (Cyclohexyl radical)	C_6H_{11}		7.66 ± 0.05	SL	8(a)	123
		C_7H_{10}				
$C_5H_6^+$ (Norbornene)	C_7H_{10}	C_2H_4	9.58 ± 0.15	SL	30(a)	2155
		C_2H_6B				
CH_3^+	$(CH_3)_3B$	$(CH_3)_2B$	15.1 ± 0.3	SL	60(b)	364
		NH				
N_2^+	HN_3	NH	16.0 ± 0.1	SL	80(b)	340
		N_2H_3				
CH_3^+	$CH_3N_2H_3$	N_2H_3	14.1 ± 0.3	SL	89(b)	424

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TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1 — *Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		C_2H_2N				
$C_2H_2N^+$	CH_2CN		10.87 ± 0.1	SL	47(a)	125
$C_2H_2N^+$	CH_2CN		10.86 ± 0.2	SL	48(a)	125
$C_2H_2N^+$	CH_2CN		10.95 ± 0.2	SL	46(a)	125
$C_3H_3^+$ (Pyridine)	C_5H_5N	C_2H_2N?	14.00 ± 0.10	EVD	101(b)	1406
		C_6H_6N				
$C_6H_6N^+$ (2-Pyridylmethyl radical)	$C_5H_4NCH_2$		8.17 ± 0.1	SL	69(a)	1011
$C_6H_6N^+$ (3-Pyridylmethyl radical)	$C_5H_4NCH_2$		7.92 ± 0.1	SL	76(a)	1011
$C_6H_6N^+$ (4-Pyridylmethyl radical)	$C_5H_4NCH_2$		8.40 ± 0.15	SL	60(a)	1011
		CH_2N_2				
CH_2^+ (Diazomethane)	CH_2N_2	N_2	12.3 ± 0.1	VC	49(a)	314
CH_2^+ (Diazirine)	CH_2N_2	N_2	11.0 ± 0.1	VC	79(a)	314
		CH_5N_2				
CH_3^+ (1,1-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3NNH_2	14.5 ± 0.3	SL	95(b)	424
CH_3^+ (1,2-Dimethylhydrazine)	$(CH_3)_2N_2H_2$	CH_3NHNH	13.9 ± 0.3	SL	83(b)	424
		$C_2H_7N_2$				
$C_2H_7N_2^+$ (1,1-Dimethylhydrazyl radical)	$(CH_3)_2N_2H$		6.6 ± 0.3	SL	16(a)	67
CH_3^+	$(CH_3)_3N_2H$	$(CH_3)_2N_2H$	14.0 ± 0.5	SL	83(b)	424
		$C_3H_9N_2$				
CH_3^+	$(CH_3)_4N_2$	$(CH_3)_3N_2$	14 ± 1	SL	83(b)	424
		NO_3				
$C_2H_5^+$	$C_2H_5ONO_2$	NO_3?	11.86 ± 0.25	VC	18(b)	1013
		CH_3O				
CH_3^+	$(CH_3)_2O$	CH_3O	13.1	RPD	1(b)	2018
		C_6H_5O				
$C_6H_5O^+$ (Phenoxy radical)	C_6H_5O		8.84	SL	22(a)	1079
		CH_2NO_3				
CH_3^+	$C_2H_5ONO_2$	CH_2ONO_2	13.75 ± 0.50	VC	21(b)	1013

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1—*Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		BHF_2				
CH_2^+	CH_3BF_2	HBF_2	16.9 ± 0.1	VC	−137(b)	1076
$C_2H_2^+$	$C_2H_3BF_2$	HBF_2	13.75 ± 0.1	VC	−190(b)	1076
$C_2H_4^+$	$C_2H_5BF_2$	HBF_2	12.08 ± 0.01	VC	−188(b)	1076
$C_3H_6^+$	*iso*-$C_3H_7BF_2$	HBF_2	11.48 ± 0.02	LE	−183(b)	1076
		C_2HF				
$C_4H_4^+$ (Fluorobenzene)	C_6H_5F	C_2HF	17.00 ± 0.1	SL	72(b)	2103
		C_2H_4F				
$C_3H_7^+$	*n*-$C_5H_{11}F$	C_2H_4F?	12.02	SL	−7(b)	2029
		CHF_2				
CHF_2^+	CHF_2		9.45	SL	−74(a)	141
CH_3^+	CH_3CHF_2	CHF_2	18.6	VC	56(b)	1288
		$C_3H_3F_3$				
$C_2H_2^+$	$C_2H_3CF_3$	HCF_3	13.3 ± 0.15	SL	−154(a)	1075
		$C_3H_5F_3$				
$C_2H_5^+$	$C_2H_5CF_3$	CF_3	12.82 ± 0.02	SL	−191(a)	1075
		CH_3BF_2				
BF_2^+	CH_3BF_2	CH_3	13.62 ± 0.02	SL	−194(a)	1076
		$C_2H_3BF_2$				
$C_2H_3^+$	$C_2H_3BF_2$	BF_2	14.25 ± 0.05	VC	−190(a)	1076
		$C_2H_5BF_2$				
$C_2H_5^+$	$C_2H_5BF_2$	BF_2	13.1 ± 0.2	VC	−214(a)	1076
		$C_3H_7BF_2$				
$C_3H_7^+$	*iso*-$C_3H_7BF_2$	BF_2	12.05 ± 0.05	VC	−219(a)	1076
		$C_3H_3OF_3$				
CH_3^+	CH_3COCF_3	$CO + CF_3$	14.60	SL	−218(a)	298
		SiH_3				
$C_2H_5^+$	$C_2H_5SiH_3$	SiH_3	12.6 ± 0.2	SL	40(b)	2182
$C_3H_7^+$	*iso*-$C_3H_7SiH_3$	SiH_3	11.33 ± 0.03	SL	33(b)	2182
		C_2H_7Si				
CH_3^+	$(CH_3)_3SiH$	$(CH_3)_2SiH$	14.8 ± 0.5	EVD	40(b)	83

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1 – *Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		$C_3H_{10}Si$				
$C_3H_9Si^+$	$(CH_3)_3SiH$	H	10.78 ± 0.07	RPD	−42(a)	1421
		$C_5H_{14}Si$				
$C_3H_9Si^+$	$(CH_3)_3SiC_2H_5$	C_2H_5	10.53 ± 0.09	RPD	−63(a)	1421
		$C_6H_{16}Si$				
$C_3H_9Si^+$	*iso*-$C_3H_7Si(CH_3)_3$	*iso*-C_3H_7	10.56 ± 0.16	RPD	−72(a)	1421
		$C_7H_{18}Si$				
$C_3H_9Si^+$	*tert*-$C_4H_9Si(CH_3)_3$	*tert*-C_4H_9	10.53 ± 0.09	RPD	−83(a)	1421
		$C_7H_{19}SiN$				
$C_3H_9Si^+$	$(CH_3)_3SiN(C_2H_5)_2$	$N(C_2H_5)_2$	12.61 ± 0.03	RPD	−98(a)	1421
		C_3H_9SiO				
$C_3H_9Si^+$	$(CH_3)_3SiOSi(CH_3)_3$	$OSi(CH_3)_3$	15.36 ± 0.13	RPD	13(b)	1421
		$C_4H_{12}SiO$				
$C_3H_9Si^+$	$(CH_3)_3SiOCH_3$	OCH_3	12.43 ± 0.18	RPD	−132(a)	1421
		C_3H_9SiBr				
$C_3H_9Si^+$	$(CH_3)_3SiBr$	Br	10.69 ± 0.06	RPD	−65(a)	1421
		CS				
CH_2^+ (Ethylene sulfide)	C_2H_4S	$CS + 2H$	20.4 ± 0.5	EVD	53(b)	51
		CHS				
$C_3H_3^+$ (Thiophene)	C_4H_4S	CHS	12.8 ± 0.2	EVD	65(b)	2166
$C_2H_3^+$ (Trimethylene sulfide)	$(CH_2)_3S$	$CHS + H_2$	16.7 ± 0.2	EVD	117(b)	52
$C_3H_3^+$ (Tetrahydrothiophene)	$(CH_2)_4S$	$CHS + 2H_2$	17.2 ± 0.2	EVD	134(b)	52
		CH_2S				
$C_2H_4^+$	$(CH_2)_3S$	CH_2S	13.6 ± 0.2	EVD	75(b)	52
		CH_3S				
CH_3^+	$(CH_3)_2S$	CH_3S	13.0	SL	32(b)	307
		C_3H_7S				
$C_3H_7^+$	$(n\text{-}C_3H_7)_2S$	n-C_3H_7S?	12.0	SL	39(b)	307

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1 – *Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		CNS				
CH_3^+	CH_3NCS	NCS	15.3 ± 0.3	EVD	125(b)	315
$C_2H_5^+$	C_2H_5NCS	NCS	12.9 ± 0.2	EVD	100(b)	315
$C_2H_3^+$	C_2H_5NCS	$NCS + H_2$	15.6 ± 0.3	LE	99(b)	315
		SNF_7				
$NF_2^{+\cdot}$	SF_5NF_2	$SF_4 + F$?	16.3 ± 0.2	VC	−245(a)	1144
		SO_2F				
NF_2^+	FSO_2NF_2	FSO_2	14.6 ± 0.3	VC	−117(b)	1144
		SO_3F				
NF_2^+	FSO_2ONF_2	FSO_3	13.3 ± 0.1	VC	−140(b)	1144
		SO_2F_2				
SO_2^+	SO_2F_2	2F	19.9 ± 0.3	SL	−208(a)	418
		CCl_3				
CCl_3^+	CCl_3		8.78 ± 0.05	EVD	11(a)	441
		$SiCl_3$				
CH_3^+	CH_3SiCl_3	$SiCl_3$	15.0 ± 0.2	SL	−40(b)	2182
$C_2H_5^+$	$C_2H_5SiCl_3$	$SiCl_3$	12.77 ± 0.05	SL	−56(b)	2182
$C_3H_7^+$	*iso*-$C_3H_7SiCl_3$	$SiCl_3$	11.36 ± 0.1	SL	−66(b)	2182
		PCl_3				
Cl^+	PCl_3	$PCl + Cl$	20.2 ± 0.4	EVD	39(a)	192
		CH_2Cl				
$C_2H_5^+$	*n*-C_3H_7Cl	CH_2Cl	12.48 ± 0.1	SL	38(b)	72
$C_3H_7^+$	*iso*-C_4H_9Cl	CH_2Cl	11.26 ± 0.1	SL	31(b)	72
CH_3^+	C_2H_5Cl	CH_2Cl?	15.9 ± 0.3	VC	81(b)	356
CH_3^+	CH_3COCH_2Cl	$CO + CH_2Cl$	13.9 ± 0.2	VC	31(b)	2174
CH_3^+ (Epichlorohydrin)	C_3H_5OCl	$CO + CH_2Cl$?	14.6 ± 0.5	EVD	77(b)	153
		C_2HCl				
$C_4H_4^+$ (Chlorobenzene)	C_6H_5Cl	C_2HCl	17.57 ± 0.1	SL	124(b)	2103
		C_7H_9Cl				
$C_5H_6^+$ (*endo*-5-Chloro-2-norbornene)	C_7H_9Cl	C_2H_3Cl	9.75 ± 0.15	SL	22(a)	2155
$C_5H_6^+$ (*exo*-5-Chloro-2-norbornene)	C_7H_9Cl	C_2H_3Cl	9.77 ± 0.15	SL	22(a)	2155
$C_5H_6^+$ (3-Chloronortricyclene)	C_7H_9Cl	C_2H_3Cl	10.15 ± 0.15	SL	13(a)	2155

TABLE 2. Heats of Formation of Gaseous Neutral Species Derived from the Data of Table 1 – *Continued*

Ion	Reactant	Other products	AP or IP (eV)	Method	Heat of formation (kcal mol^{-1})	Ref.
		As_2H_4				
As^+	As_2H_4	$As + 2H_2$	14.3 ± 0.3	LE	41(a)	2133
		CH_2Br				
CH_3^+	C_2H_5Br	CH_2Br	16.9 ± 0.3	VC	115(b)	356
CH_3^+ (Epibromohydrin)	C_3H_5OBr	$CO + CH_2Br$?	15.6 ± 0.5	EVD	112(b)	153
		C_2HBr				
$C_4H_4^+$ (Bromobenzene)	C_6H_5Br	C_2HBr	16.77 ± 0.1	SL	118(b)	2103
		Sn_2H_6				
Sn^+	Sn_2H_6	$3H_2 + Sn$	10.8 ± 0.3	LE	65(a)	2133
		C_3H_9Sn				
$C_3H_9Sn^+$	$(CH_3)_3SnSn(CH_3)_3$	$(CH_3)_3Sn$	9.84 ± 0.09	RPD	29(b)	1424
		Sb_2H_4				
Sb^+	Sb_2H_4	$Sb + 2H_2$	11.5 ± 0.3	LE	59(a)	2133
		CH_2I				
CH_3^+	C_2H_5I	CH_2I	16.3 ± 0.3	VC	115(b)	356
		HgCl				
CH_3^+	CH_3HgCl	HgCl	14.8 ± 0.2	SL	70(b)	306
		CH_3Hg				
CH_3^+	$(CH_3)_2Hg$	CH_3Hg	13.4 ± 0.1	SL	76(b)	306
		C_3H_7Hg				
$C_3H_7^+$	(*iso*-$C_3H_7)_2Hg$	*iso*-C_3H_7Hg	9.65 ± 0.1	SL	45(b)	306
		C_4H_9Hg				
$C_4H_9^+$	(n-$C_4H_9)_2Hg$	n-C_4H_9Hg	10.55 ± 0.1	SL	31(b)	306
		PbH_4				
Pb^+	PbH_4	$H_2 + 2H$	11.2	LE	64(a)	2116
		BiH_3				
Bi^+	BiH_3	$3H$	13.4	LE	65(a)	2116

5. Bibliography for Tables 1 and 2*

1 Berkowitz, J., Bafus, D. A., and Brown, T. L., The mass spectrum of ethyllithium vapor, J. Phys. Chem. **65,** 1380 (1961).

2 Berkowitz, J., Chupka, W. A., and Kistiakowsky, G. B., Mass spectrometric study of the kinetics of nitrogen afterglow, J. Chem. Phys. **25,** 457 (1956).

3 Asundi, R. K., and Kurepa, M. V., The calibration of the electron energy scale for ionization potential measurements, J. Sci. Instr. **40,** 183 (1963).

4 Berthier, G., LCAO Self-consistent field calculations of the π-electrons energy levels and electronic structure of fulvene, J. Chem. Phys. **21,** 953 (1953).

6 Branscomb, L. M., Calculated calibration points for negative ion appearance potentials, J. Chem. Phys. **29,** 452 (1958).

8 Carette, J. D., and Kerwin, L., Une étude du phosphore rouge par spectrométrie de masse, Can. J. Phys. **39,** 1300 (1961).

11 · Chupka, W. A., Effect of unimolecular decay kinetics on the interpretation of appearance potentials, J. Chem. Phys. **30,** 191 (1959).

13 Coats, F. H., and Anderson, R. C., Thermodynamic data from electron-impact measurements on acetylene and substituted acetylenes, J. Am. Chem. Soc. **79,** 1340 (1957).

14 Collin, J., Ionization potentials of methylamines and ethylamines by electron impact, Can. J. Chem. **37,** 1053 (1959).

16 Mann, J. B., Ionization of U, UO, and UO_2 by electron impact, J. Chem. Phys. **40,** 1632 (1964).

17 Collin, J., and Lossing, F. P., Mass spectra of propyne and propyne-d_3, and the appearance potentials of $C_3H_4^+$, $C_3H_3^+$ and equivalent deuterated ions, J. Am. Chem. Soc. **80,** 1568 (1958).

20 Curran, R. K., Negative ion formation in ozone, J. Chem. Phys. **35,** 1849 (1961).

24 Dibeler, V. H., Reese, R. M., and Mohler, F. L., Ionization and dissociation of the trifluoromethyl halides by electron impact, J. Res. NBS **57,** 113 (1956) RP2700.

25 Dorman, F. H., Morrison, J. D., and Nicholson, A. J. C., Probability of multiple ionization by electron impact, J. Chem. Phys. **31,** 1335 (1959).

28 Sjögren, H., and Lindholm, E., Higher ionisation potentials in alcohols and water measured by electron impact, Phys. Letters **4,** 85 (1963).

29 Fisher, I. P., and Lossing, F. P., Ionization potential of benzyne, J. Am. Chem. Soc. **85,** 1018 (1963).

30 Flesch, G. D., and Svec, H. J., The mass spectra of chromyl chloride, chromyl chlorofluoride and chromyl fluoride, J. Am. Chem. Soc. **81,** 1787 (1959).

31 Foner, S. N., and Hudson, R. L., Ionization potential of the free HO_2 radical and the $H-O_2$ bond dissociation energy, J. Chem. Phys. **23,** 1364 (1955).

33 Foner, S. N., and Hudson, R. L., Diimide—identification and study by mass spectrometry, J. Chem. Phys. **28,** 719 (1958).

34 Foner, S. N., and Hudson, R. L., Mass spectrometric detection of triazene and tetrazene and studies of the free radicals NH_2 and N_2H_3, J. Chem. Phys. **29,** 442 (1958).

35 Foner, S. N., and Nall, B. H., Structure in the ionization near threshold of rare gases by electron impact, Phys. Rev. **122,** 512 (1961).

36 Foner, S. N., and Hudson, R. L., Mass spectrometry of the HO_2 free radical, J. Chem. Phys. **36,** 2681 (1962).

37 Foner, S. N., and Hudson, R. L., Ionization and dissociation of hydrogen peroxide by electron impact, J. Chem. Phys. **36,** 2676 (1962).

39 Fox, R. E., Threshold ionization of HCl by electron impact, J. Chem. Phys. **32,** 385 (1960).

42 Malone, T. J., and McGee, H. A., Jr., Mass spectrometric investigations of the synthesis, stability, and energetics of the low-temperature oxygen fluorides. I. Dioxygen difluoride, J. Phys. Chem. **69,** 4338 (1965).

43 Hobrock, D. L., and Kiser, R. W., Electron impact studies of some trihalomethanes: Trichloromethane, dichlorofluoromethane, chlorodifluoromethane, and trifluoromethane, J. Phys. Chem. **68,** 575 (1964).

46 Friedman, L., Long, F. A., and Wolfsberg, M., Study of the mass spectra of the lower aliphatic alcohols, J. Chem. Phys. **27,** 613 (1957).

49 Frost, D. C., and McDowell, C. A., The dissociation energy of the nitrogen molecule, Proc. Roy. Soc. (London) **A236,** 278 (1956).

50 Gallegos, E. J., and Kiser, R. W., Electron impact spectroscopy of ethylene oxide and propylene oxide, J. Am. Chem. Soc. **83,** 773 (1961).

51 Gallegos, E., and Kiser, R. W., Electron impact spectroscopy of ethylene sulfide and ethylenimine, J. Phys. Chem. **65,** 1177 (1961).

52 Gallegos, E. J., and Kiser, R. W., Electron impact spectroscopy of the four- and five-membered, saturated heterocyclic compounds containing nitrogen, oxygen and sulfur, J. Phys. Chem. **66,** 136 (1962).

53 Dibeler, V. H., Reese, R. M., and Mann, D. E., Ionization and dissociation of perchloryfluoride by electron impact, J. Chem. Phys. **27,** 176 (1957).

54 Dibeler, V. H., and Reese, R. M., Mass spectrometric study of photoionization. I. Apparatus and initial observations on acetylene, acetylene-d_2, benzene and benzene-d_6, J. Res. NBS **68A** (Phys. and Chem.) No. 4, 409 (1964).

58 Collin, J., and Lossing, F. P., Ionization and dissociation of NO_2 and N_2O by electron impact, J. Chem. Phys. **28,** 900 (1958).

59 Farmer, J. B., and Lossing, F. P., Free radicals by mass spectrometry. VII. The ionization potentials of ethyl, isopropyl, and propargyl radicals and the appearance potentials of the radical ions in some derivatives, Can. J. Chem. **33,** 861 (1955).

61 Frost, D. C., Mak, D., and McDowell, C. A., The photoionization of nitrogen dioxide, Can. J. Chem. **40,** 1064 (1962).

62 Collin, J., and Lossing, F. P., Ionization potentials of some olefins, di-olefins and branched paraffins, J. Am. Chem. Soc. **81,** 2064 (1959).

67 Foner, S. N., and Hudson, R. L., Mass spectrometry of inorganic free radicals, Advan. Chem. Ser. **36,** 34 (1962).

68 Harrison, A. G., Honnen, L. R., Dauben, H. J., Jr., and Lossing, F. P., Free radicals by mass spectrometry. XX. Ionization potentials of cyclopentadienyl and cycloheptatrienyl radicals, J. Am. Chem. Soc. **82,** 5593 (1960).

69 Harrison, A. G., Kebarle, P., and Lossing, F. P., Free radicals by mass spectrometry. XXI. The ionization potentials of some meta and para substituted benzyl radicals, J. Am. Chem. Soc. **83,** 777 (1961).

70 Harrison, A. G., and Lossing, F. P., Free radicals by mass spectrometry. XVII. Ionization potential and heat of formation of vinyl radical, J. Am. Chem. Soc. **82,** 519 (1960).

71 Harrison, A. G., and Lossing, F. P., Free radicals by mass spectrometry. XVIII. The ionization potentials of conjugated hydrocarbon radicals and the resonance

*Note that the numbering is not continuous and should cause no concern.

energies of radicals and carbonium ions, J. Am. Chem. Soc. **82,** 1052 (1960).

72 Harrison, A. G., and Shannon, T. W., An electron impact study of chloromethyl and dichloromethyl derivatives, Can. J. Chem. **40,** 1730 (1962).

73 Herron, J. T., and Dibeler, V. H., Electron impact study of the cyanogen halides, J. Am. Chem. Soc. **82,** 1555 (1960).

74 Herron, J. T., and Dibeler, V. H., Mass spectrum and appearance potentials of tetrafluorohydrazine, J. Chem. Phys. **33,** 1595 (1960).

75 Herron, J. T., and Dibeler, V. H., Ionization potential of fluorine, J. Chem. Phys. **32,** 1884 (1960).

76 Herron, J. T., and Dibeler, V. H., Mass spectrometric study of NF_2, NF_3, N_2F_2, and N_2F_4, J. Res. NBS **65A** (Phys. and Chem.) No. 5, 405 (1961).

77 Herron, J. T., and Schiff, H. I., Mass spectrometry of ozone, J. Chem. Phys. **24,** 1266 (1956).

78 Herron, J. T., Rate of the reaction NO+N, and some heterogeneous reactions observed in the ion source of a mass spectrometer, J. Res. NBS **65A** (Phys. and Chem.) No. 5, 411 (1961).

79 Herron, J. T., and Schiff, H. I., A mass spectrometric study of normal oxygen and oxygen subjected to electrical discharge, Can. J. Chem. **36,** 1159 (1958).

82 Hobrock, B. G., and Kiser, R. W., Electron impact spectroscopy of tetramethylsilicon, -tin and -lead, J. Phys. Chem. **65,** 2186 (1961).

83 Hobrock, B. G., and Kiser, R. W., Electron impact spectroscopy of tetramethylgermanium, trimethylsilane, and dimethylmercury, J. Phys. Chem. **66,** 155 (1962).

84 Hobrock, B. G., and Kiser, R. W., Electron impact investigations of sulfur compounds. III. 2-Thiapropane 3-thiapentane, and 2,3,4-trithiapentane, J. Phys. Chem. **67,** 1283 (1963).

86 Hurzeler, H., Inghram, M. G., and Morrison, J. D., Photon impact studies of molecules using a mass spectrometer, J. Chem. Phys. **28,** 76 (1958).

87 Beck, D., Neutral fragments from hydrocarbons under electron impact, Discussions Faraday Soc. **36,** 56 (1963).

88 Junk, G., and Svec, H., The mass spectra of the α-amino acids, J. Am. Chem. Soc. **85,** 839 (1963).

90 Kandel, R. J., Appearance potential studies. II. Nitromethane, J. Chem. Phys. **23,** 84 (1955).

92 Al-Joboury, M. I., May, D. P., and Turner, D. W., Molecular photoelectron spectroscopy. Part IV. The ionisation potentials and configurations of carbon dioxide, carbon oxysulphide, carbon disulphide, and nitrous oxide, J. Chem. Soc. 6350 (1965).

95 Murad, E., and Inghram, M. G., Photoionization of aliphatic ketones, J. Chem. Phys. **40,** 3263 (1964).

97 Lambdin, W. J., Tuffly, B. L., and Yarborough, V. A., Appearance potentials as obtained with an analytical mass spectrometer, Appl. Spectry. **13,** 71 (1959).

99 Dibeler, V. H., and Reese, R. M., Multiple ionization of sodium vapor by electron impact, J. Chem. Phys. **31,** 282 (1959).

100 Loughran, E. D., and Mader, C., Appearance potential study of tetrafluorohydrazine, J. Chem. Phys. **32,** 1578 (1960).

101 Lowrey, A., III, and Watanabe, K., Absorption and ionization coefficients of ethylene oxide, J. Chem. Phys. **28,** 208 (1958).

102 Margrave, J. L., A mass spectrometric appearance potential study of diborane, J. Phys. Chem. **61,** 38 (1957).

103 Margrave, J. L., Ionization potentials of B_5H_9, B_5H_8I, $B_{10}H_{14}$, and $B_{10}H_{13}C_2H_5$ from electron impact studies, J. Chem. Phys. **32,** 1889 (1960).

104 Kiser, R. W., Estimation of the ionization potential and dissociation energy of molecular astatine, J. Chem. Phys. **33,** 1265 (1960).

108 McDowell, C. A., Lossing, F. P., Henderson, I. H. S., and Farmer, J. B., Free radicals by mass spectrometry X. The ionization potentials of methyl substituted allyl radicals, Can. J. Chem. **34,** 345 (1956).

112 Winters, R. E., and Kiser, R. W., A mass spectrometric investigation of nickel tetracarbonyl and iron pentacarbonyl, Inorg. Chem. **3,** 699 (1964).

114 Momigny, J., Comportement des dihalogènoéthylènes cis et trans sous l'impact électronique, Bull. Soc. Chim. Belges **70,** 241 (1961).

115 Wada, Y., and Kiser, R. W., A mass spectrometric study of trimethyl borate, J. Phys. Chem. **68,** 1588 (1964).

116 Brion, C. E., Ionization of oxygen by "monoenergetic" electrons, J. Chem. Phys. **40,** 2995 (1964).

117 Nakayama, T., Kitamura, M. Y., and Watanabe, K., Ionization potential and absorption coefficients of nitrogen dioxide, J. Chem. Phys. **30,** 1180 (1959).

119 Melton, C. E., and Hamill, W. H., Appearance potentials of positive and negative ions by mass spectrometry, J. Chem. Phys. **41,** 546 (1964).

120 Palmer, T. F., and Lossing, F. P., Free radicals by mass spectrometry. XXVIII. The HS, CH_3S, and phenyl-S radicals: ionization potentials and heats of formation, J. Am. Chem. Soc. **84,** 4661 (1962).

122 Meyer, F., and Harrison, A. G., An electron impact study of methyl phenyl ethers, Can. J. Chem. **42,** 2008 (1964).

123 Pottie, R. F., Harrison, A. G., and Lossing, F. P., Free radicals by mass spectrometry. XXIV. Ionization potentials of cycloalkyl free radicals and cycloalkanes, J. Am. Chem. Soc. **83,** 3204 (1961).

124 Pottie, R. F., and Lossing, F. P., Free radicals by mass spectrometry. XXIII. Mass spectra of benzyl and α-d_2-benzyl free radicals, J. Am. Chem. Soc. **83,** 2634 (1961).

125 Pottie, R. F., and Lossing, F. P., Free radicals by mass spectrometry. XXV. Ionization potentials of cyanoalkyl radicals, J. Am. Chem. Soc. **83,** 4737 (1961).

126 Pottie, R. F., and Lossing, F. P., Free radicals by mass spectrometry. XXIX. Ionization potentials of substituted cyclopentadienyl radicals, J. Am. Chem. Soc. **85,** 269 (1963).

127 Reed, R. I., Studies in electron impact methods. Part 1.—Formaldehyde, deuteroformaldehyde, and some related compounds, Trans. Faraday Soc. **52,** 1195 (1956).

128 Reed, R. I., and Brand, J. C. D., Electron impact studies. Part 4.—Glyoxal, methylglyoxal and diacetyl, Trans. Faraday Soc. **54,** 478 (1958).

129 Reed, R. I., and Snedden, W., Studies in electron impact methods. Part 2.—The latent heat of sublimation of carbon, Trans. Faraday Soc. **54,** 301 (1958).

130 Reed, R. I., and Thornley, M. B., Studies in electron impact methods. Part 5.—Acetaldehyde, acrolein, benzaldehyde, and propionaldehyde, Trans. Faraday Soc. **54,** 949 (1958).

131 Reed, R. I., and Snedden, W., Studies in electron impact methods. Part 6.—The formation of the methine and carbon ions, Trans. Faraday Soc. **55,** 876 (1956).

132 Reed, R. I., and Snedden, W., The ionisation potential of NH, J. Chem. Soc. 4132 (1959).

133 Samson, J. A. R., Marmo, F. F., and Watanabe, K., Absorption and photoionization coefficients of propylene and butene-1 in the vacuum ultraviolet, J. Chem. Phys. **36,** 783 (1962).

135 Schissler, D. O., and Stevenson, D. P., The benzyl-hydrogen bond dissociation energy from electron impact measurements, J. Chem. Phys. **22,** 151 (1954).

136 Streitwieser, A., Jr., A molecular orbital study of ionization potentials of organic compounds utilizing the ω-technique, J. Am. Chem. Soc. **82,** 4123 (1960).

138 Sun, H., and Weissler, G. L., Absorption cross sections of methane and ammonia in the vacuum ultraviolet, J. Chem. Phys. **23,** 1160 (1955).

139 Kiser, R. W., and Hisatsune, I. C., Electron impact spectroscopy of nitrogen dioxide, J. Phys. Chem. **65,** 1444 (1961).

141 Lossing, F. P., Kebarle, P., and DeSousa, J. B., Ionization potentials of alkyl and halogenated alkyl free radicals, Advan. Mass Spectrometry **1,** 431 (1959).

145 Lossing, F. P., and DeSousa, J. B., Free radicals by mass spectrometry. XIV. Ionization potentials of propyl and butyl free radicals, J. Am. Chem. Soc. **81**, 281 (1959).
148 Tanaka, Y., Jursa, A. S., and LeBlanc, F. J., Higher ionization potentials of linear triatomic molecules. I. CO_2, J. Chem. Phys. **32**, 1199 (1960).
149 Tanaka, Y., Jursa, A. S., and LeBlanc, F. J., Higher ionization potentials of linear triatomic molecules II. CS_2, COS, and N_2O, J. Chem. Phys. **32**, 1205 (1960).
151 Taubert, R., and Lossing, F. P., Free radicals by mass spectrometry. XXVII. Ionization potentials of four pentyl radicals, J. Am. Chem. Soc. **84**, 1523 (1962).
153 Wada, Y., and Kiser, R. W., Electron impact spectroscopy of some substituted oxiranes, J. Phys. Chem. **66**, 1652 (1962).
154 Dibeler, V. H., Reese, R. M., and Franklin, J. L., Mass spectrometric study of cyanogen and cyanoacetylenes, J. Am. Chem. Soc. **83**, 1813 (1961).
155 Walker, W. C., and Weissler, G. L., Photoionization efficiencies and cross sections in NH_3, J. Chem. Phys. **23**, 1540 (1955).
156 Walker, W. C., and Weissler, G. L., Preliminary data on photoionization efficiencies and cross sections in C_2H_4 and C_2H_2, J. Chem. Phys. **23**, 1547 (1955).
157 Walker, W. C., and Weissler, G. L., Photoionization efficiencies and cross sections in N_2O and NO, J. Chem. Phys. **23**, 1962 (1955).
158 Watanabe, K., Photoionization and total absorption cross section of gases. I. Ionization potentials of several molecules. Cross sections of NH_3 and NO, J. Chem. Phys. **22**, 1564 (1954).
159 Watanabe, K., and Mottl, J. R., Ionization potentials of ammonia and some amines, J. Chem. Phys. **26**, 1773 (1957).
160 Tsuda, S., and Hamill, W. H., Structure in ionization—efficiency curves near threshold from alkanes and alkyl halides, J. Chem. Phys. **41**, 2713 (1964).
161 Watanabe, K., and Nakayama, T., Absorption and photoionization coefficients of furan vapor, J. Chem. Phys. **29**, 48 (1958).
162 Watanabe, K., and Namioka, T., Ionization potential of propyne, J. Chem. Phys. **24**, 915 (1956).
163 Weissler, G. L., Samson, J. A. R., Ogawa, M., and Cook, G. R., Photoionization analysis by mass spectroscopy, J. Opt. Soc. Am. **49**, 338 (1959).
164 Collin, J., Étude des états excités des ions par spectrometrie de masse, Bull. Classe Sci. Acad. Roy. Belg. **45**, 734 (1959).
165 Wiberg, K. B., Bartley, W. J., and Lossing, F. P., On the strain energy in cyclopropene and the heat of formation of the $C_3H_3^+$ ion, J. Am. Chem. Soc. **84**, 3980 (1962).
166 Collin, J. E., Ionization and dissociation of molecules by monoenergetic electrons V. Acetylene and ethylene, Bull. Soc. Chim. Belges **71**, 15 (1962).
168 Bralsford, R., Harris, P. V., and Price, W. C., The effect of fluorine on the electronic spectra and ionization potentials of molecules, Proc. Roy. Soc. (London) **A258**, 459 (1960).
169 Collin, J., L'ionisation et la dissociation des molécules par des electrons monoenergetiques. II.—Etats excités de l'ion moléculaire de CO_2 et CS_2, J. Chim. Phys. **57**, 424 (1960).
171 Hirota, K., Nagoshi, K., and Hatada, M., Studies on mass spectra and appearance potentials of acetic acid and deuteroacetic acid CD_3COOH Bull. Chem. Soc. Japan **34**, 226 (1961).
173 Saalfeld, F. E., and Svec, H. J., Mass spectra of volatile hydrides. III. Silylphosphine, Inorg. Chem. **3**, 1442 (1964).
174 Porter, R. F., and Schoonmaker, R. C., A mass spectrometric study of the vaporization of ferrous bromide, J. Phys. Chem. **63**, 626 (1959).
176 Hobrock, B. G., and Kiser, R. W., Electron impact spectroscopy of sulfur compounds. I. 2-Thiabutane, 2-thiapentane, and 2,3-dithiabutane, J. Phys. Chem. **66**, 1648 (1962).
178 Berkowitz, J., and Marquart, J. R., Mass—spectrometric study of the magnesium halides, J. Chem. Phys. **37**, 1853 (1962).
182 Watanabe, K., Nakayama, T., and Mottl, J. Ionization potentials of some molecules, J. Quant. Spectrosc. Radiat. Transfer **2**, 369 (1962).
185 Curran, R. K., Positive and negative ion formation in CCl_3F, J. Chem. Phys. **34**, 2007 (1961).
186 Hobrock, B. G., and Kiser, R. W., Electron impact investigations of sulfur compounds. II. 3-Methyl-2-thiabutane, 4-thia-1-pentene, and 3,4-dithiahexane, J. Phys. Chem. **67**, 648 (1963).
188 Hobrock, B. G., and Kiser, R. W., Electron impact spectroscopy of propylene sulfide, J. Phys. Chem. **66**, 1551 (1962).
189 Kaufman, J. J., Koski, W. S., Kuhns, L. J., and Law, R. W., Appearance and ionization potentials of selected fragments from decaborane, $B^{11}{}_{10}H_{14}$, J. Am. Chem. Soc. **84**, 4198 (1962).
190 Matsunaga, F. M., Photoionization yield of several molecules in the Schumann region, Contribution No. 27, Hawaii Institute of Geophysics, Honolulu (1961).
191 Kiser, R. W., and Hobrock, B. G., The ionization potential of hydrogen disulfide (H_2S_2), J. Phys. Chem. **66**, 1214 (1962).
192 Sandoval, A. A., Moser, H. C., and Kiser, R. W., Ionization and dissociation processes in phosphorus trichloride and diphosphorus tetrachloride, J. Phys. Chem. **67**, 124 (1963).
193 Shenkel, R. C., Hobrock, B. G., and Kiser, R. W., The ionization potential of (iso)thiocyanic acid, J. Phys. Chem. **66**, 2074 (1962).
194 Omura, I., Study on unimolecular decomposition of excited olefin ions, Bull. Chem. Soc. Japan **35**, 1845 (1962).
195 Omura, I., Mass spectra at low ionizing voltage and bond dissociation energies of molecular ions from hydrocarbons, Bull. Chem. Soc. Japan **34**, 1227 (1961).
196 Fox, R. E., and Curran, R. K., Ionization processes in CCl_4 and SF_6 by electron beams, J. Chem. Phys. **34**, 1595 (1961).
198 Fox, R. E., Multiple ionization in argon and krypton by electron impact, J. Chem. Phys. **33**, 200 (1960).
199 Fox, R. E., Negative ion formation in hydrogen chloride by electron impact, J. Chem. Phys. **26**, 1281 (1957).
200 Curran, R. K., Negative ion formation in various gases at pressures up to .5 mm of Hg, Scientific Paper 62–908–113–P7, Westinghouse Research Laboratories, Pittsburgh (1962).
201 Kiser, R. W., Studies of the shapes of ionization—efficiency curves of multiply charged monatomic ions. I. Instrumentation and relative electronic-transition probabilities for krypton and xenon ions, J. Chem. Phys. **36**, 2964 (1962).
202 Kiser, R. W., and Hobrock, B. G., The ionization potentials of cyclopropyl radical and cyclopropyl cyanide, J. Phys. Chem. **66**, 957 (1962).
204 Brand, J. C. D., and Reed, R. I., The electronic spectrum of formaldehyde. Part II. Mechanisms of dissociation of formaldehyde and the formaldehyde molecular ion, J. Chem. Soc., 2386 (1957).
205 Kaufman, J. J., Koski, W. S., and Wright, S. S., Appearance and ionization potentials of selected fragments from isotopically labeled pentaboranes, J. Am. Chem. Soc. **85**, 1369 (1963).
206 Koski, W. S., Kaufman, J. J., and Pachucki, C. F., A mass spectroscopic appearance potential study of some boron trihalides, J. Am. Chem. Soc. **81**, 1326 (1959).
209 Koski, W. S., Kaufman, J. J., Pachucki, C. F., and Shipko, F. J., A mass spectrometric appearance potential study of isotopically labeled diboranes, J. Am. Chem. Soc. **80**, 3202 (1958).
210 Van Raalte, D., and Harrison, A. G., Ionization and dissociation of formate esters by electron impact, Can. J. Chem. **41**, 2054 (1963).

211 Dorman, F. H., and Morrison, J. D., Ionization potentials of multiply charged krypton, xenon, and mercury, J. Chem. Phys. **34,** 1407 (1961).
212 Dorman, F. H., and Morrison, J. D., Double and triple ionization in molecules induced by electron impact, J. Chem. Phys. **35,** 575 (1961).
213 Morrison, J. D., Hurzeler, H., Inghram, M. G., and Stanton, H. E., Threshold law for the probability of excitation of molecules by photon impact. A study of the photoionization efficiencies of Br_2, I_2, HI, and CH_3I, J. Chem. Phys. **33,** 821 (1960).
214 Margrave, J. L., Ionization potentials for C_2F_4, C_2F_3Cl, and $C_2F_2Cl_2$ and the appearance potential of CF_2^+ from C_2F_4, J. Chem. Phys. **31,** 1432 (1959).
217 Basila, M. R., and Clancy, D. J., The ionization potentials of monosubstituted pyridines by electron impact, J. Phys. Chem. **67,** 1551 (1963).
218 Kiser, R. W., and Gallegos, E. J., A technique for the rapid determination of ionization and appearance potentials, J. Phys. Chem. **66,** 947 (1962).
219 Lifshitz, C., and Bauer, S. H., Mass spectra of valence tautomers, J. Phys. Chem. **67,** 1629 (1963).
224 Melton, C. E., and Hamill, W. H., Appearance potentials by the retarding potential-difference method for secondary ions produced by excited-neutral, excited ion-neutral, and ion-neutral reactions, J. Chem. Phys. **41,** 1469 (1964).
230 Wainfan, N., Walker, W. C., and Weissler, G. L., Photoionization efficiencies and cross sections in O_2, N_2, CO_2, A, H_2O, H_2, and CH_4, Phys. Rev. **99,** 542 (1955).
248 Al-Joboury, M. I., and Turner, D. W., Molecular photoelectron spectroscopy. Part I. The hydrogen and nitrogen molecules, J. Chem. Soc. 5141 (1963).
261 Walsh, A. D., The absorption spectra of the chloro ethylenes in the vacuum ultra-violet, Trans. Faraday Soc. **41,** 35 (1945).
268 Momigny, J., Ionization potentials and the structures of the photo-ionization yield curves of ethylene and its halogeno derivatives, Nature **199,** 1179 (1963).
269 Teegan, J. P., and Walsh, A. D., The absorption spectrum of 1 : 1-dichloroethylene in the vacuum ultra-violet, Trans. Faraday Soc. **47,** 1 (1951).
282 Morrison, J. D., and Nicholson, A. J. C., Studies of ionization efficiency. Part II. The ionization potentials of some organic molecules, J. Chem. Phys. **20,** 1021 (1952).
286 Frost, D. C., and McDowell, C. A., The determination of ionization and dissociation potentials of molecules by radiation with electrons, Report No. AFCRL–TR–60–423, University of British Columbia, Vancouver (1960).
287 Frost, D. C., and McDowell, C. A., The ionization and dissociation of oxygen by electron impact, J. Am. Chem. Soc. **80,** 6183 (1958).
288 Frost, D. C., and McDowell, C. A., Recent electron impact studies on simple molecules (O_2, Cl_2, I_2), Advan. Mass Spectrometry **1,** 413 (1959).
289 Frost, D. C., and McDowell, C. A., Studies of the ionization of molecules by electron impact. II. Excited states of the molecular ions of methane and the methyl halides, Proc. Roy. Soc. (London) **A241,** 194 (1957).
292 Frost, D. C., and McDowell, C. A., The ionization and dissociation of some halogen molecules by electron impact, Can. J. Chem. **38,** 407 (1960).
298 Majer, J. R., Patrick, C. R., and Robb, J. C., Appearance potentials of the acetyl radical-ion, Trans. Faraday Soc. **57,** 14 (1961).
299 Majer, J. R., and Patrick, C. R., Ionization potentials of perfluorocycloalkanes, Nature **193,** 161 (1962).
301 Majer, J. R., and Patrick, C. R., Electron impact on some halogenated aromatic compounds, Trans. Faraday Soc. **58,** 17 (1962).
303 Gowenlock, B. G., Jones, P. P., and Majer, J. R., Bond dissociation energies in some molecules containing alkyl substituted CH_3, NH_2, and OH, Trans. Faraday Soc. **57,** 23 (1961).
304 Gowenlock, B. G., Majer, J. R., and Snelling, D. R., Bond dissociation energies in some azo compounds, Trans. Faraday Soc. **58,** 670 (1962).
305 Brion, C. E., and Dunning, W. J., Electron impact studies of simple carboxylic esters, Trans. Faraday Soc. **59,** 647 (1963).
306 Gowenlock, B. G., Haynes, R. M., and Majer, J. R., Electron impact measurement on some organomercury compounds, Trans. Faraday Soc. **58,** 1905 (1962).
307 Gowenlock, B. G., Kay, J., and Majer, J. R., Electron impact studies of some sulphides and disulphides, Trans. Faraday Soc. **59,** 2463 (1963).
308 Majer, J. R., and Patrick, C. R., Appearance potentials of the benzoyl radical-ion, Trans. Faraday Soc. **59,** 1274 (1963).
314 Paulett, G. S., and Ettinger, R., Mass spectra and appearance potentials of diazirine and diazomethane, J. Chem. Phys. **39,** 825 (1963).
315 Hobrock, B. G., Shenkel, R. C., and Kiser, R. W., Singly- and doubly-charged ions from methyl and ethyl isothiocyanates by electron impact, J. Phys. Chem. **67,** 1684 (1963).
317 Bakulina, I. N., and Ionov, N. I., Determination of the ionization potential of uranium atoms by the surface ionization method, Zh. Eksperim. i Teor. Fiz. **36,** 1001 (1959).
318 Berkowitz, J., Chupka, W. A., Blue, G. D., and Margrave, J. L., Mass spectrometric study of the sublimation of lithium oxide, J. Phys. Chem. **63,** 644 (1959).
319 Blanchard, L. P., and LeGoff, P., Mass spectrometric study of the species CS, SO, and CCl_2 produced in primary heterogeneous reactions, Can. J. Chem. **35,** 89 (1957).
328 Cloutier, G. G., and Schiff, H. I., Electron impact study of nitric oxide using a modified retarding potential difference method, J. Chem. Phys. **31,** 793 (1959).
331 Ditchburn, R. W., Absorption cross-sections in the vacuum ultra-violet. III. Methane, Proc. Roy. Soc. (London) **A229,** 44 (1955).
333 Drowart, J., DeMaria, G., and Inghram, M. G., Thermodynamic study of SiC utilizing a mass spectrometer, J. Chem. Phys. **29,** 1015 (1958).
335 Duncan, A. B. F., Electronic structure of ammonia, J. Chem. Phys. **27,** 423 (1957).
339 Van Raalte, D., and Harrison, A. G., Energetics and mechanism of hydronium ion formation by electron impact, Can. J. Chem. **41,** 3118 (1963).
340 Franklin, J. L., Dibeler, V. H., Reese, R. M., and Krauss, M., Ionization and dissociation of hydrazoic acid and methyl azide by electron impact, J. Am. Chem. Soc. **80,** 298 (1958).
341 Fred, M., and Tomkins, F. S., Preliminary term analysis of Am I and Am II spectra, J. Opt. Soc. Am. **47,** 1076 (1957).
344 Hammond, V. J., Price, W. C., Teegan, J. P., and Walsh, A. D., The absorption spectra of some substituted benzenes and naphthalenes in the vacuum ultraviolet, Discussions Farraday Soc. **9,** 53 (1950).
348 Hedges, R. M., and Matsen, F. A., Antisymmetrized Huckel orbital calculations of ionization potentials and electron affinities of some aromatic hydrocarbons, J. Chem. Phys. **28,** 950 (1958).
349 Herzberg, G., and Shoosmith, J., Absorption spectrum of free CH_3 and CD_3 radicals, Can. J. Phys. **34,** 523 (1956).
353 Higuchi, J., Some calculations based on an LCGO–MO treatment, J. Chem. Phys. **32,** 636 (1960).
355 Iczkowski, R. P., and Margrave, J. L., Absorption spectrum of fluorine in the vacuum ultraviolet, J. Chem. Phys. **30,** 403 (1959).
356 Irsa, A. P., Electron impact studies on C_2H_5Cl, C_2H_5Br, and C_2H_5I, J. Chem. Phys. **26,** 18 (1957).
357 Irsa, A. P., and Friedman, L., Mass spectra of halogen fluorides, J. Inorg. Nucl. Chem. **6,** 77 (1958).
362 Kreuzer, H., Appearance-Potentiale von BF_3^+ und BF_2^+ aus BF_3 bei elektronenstoss, Z. Naturforsch. **12a,** 519 (1957).
364 Law, R. W., and Margrave, J. L., Mass spectrometer appearance potentials for positive ion fragments from

BF_3, $B(CH_3)_3$, $B(C_2H_5)_3$, $B(OCH_3)_3$, and $HB(OCH_3)_2$, J. Chem. Phys. **25**, 1086 (1956).

381 Omura, I., Baba, H., and Higasi, K., The ionization potentials of some conjugated molecules, J. Phys. Soc. Japan **10**, 317 (1955).

383 Omura, I., Higasi, K., and Baba, H., Ionization potentials of some organic molecules. I. Apparatus, Bull. Chem. Soc. Japan **29**, 591 (1956).

384 Omura, I., Higasi, K., and Baba, H., Ionization potentials of some organic molecules. II. Aliphatic compounds, Bull. Chem. Soc. Japan **29**, 504 (1956).

387 Price, W. C., The far ultraviolet absorption spectra and ionization potentials of H_2S, CS_2, and SO_2, Bull. Am. Phys. Soc. **10**, 9 (1935).

397 Schoonmaker, R. C., and Porter, R. F., Mass Spectrometric study of ferrous chloride vapor, J. Chem. Phys. **29**, 116 (1958).

401 Reese, R. M., and Dibeler, V. H., Ionization and dissociation of nitrogen trifluoride by electron impact, J. Chem. Phys. **24**, 1175 (1956).

409 Tanaka, Y., Jursa, A. S., and LeBlanc, F. J., Higher ionization potentials of linear triatomic molecules, Spectrochim. Acta **10**, 233 (1957).

410 Tanaka, Y., Jursa, A. S., and LeBlanc, F. J., Higher ionization potentials of linear triatomic molecules CO_2, CS_2, COS, N_2O, J. Chem. Phys. **28**, 350 (1958).

411 Varsel, C. J., Morrell, F. A., Resnik, F. E., and Powell, W. A., Qualitative and quantitative analysis of organic compounds. Use of low-voltage mass spectrometry, Anal. Chem. **32**, 182 (1960).

413 Wacks, M. E., and Dibeler, V. H., Electron impact studies of aromatic hydrocarbons. I. Benzene, naphthalene, anthracene, and phenanthrene, J. Chem. Phys. **31**, 1557 (1959).

414 Waldron, J. D., The ionization and dissociation of methyl radicals on electron impact, Metropolitan Vickers Gaz. **27**, 66 (1956).

416 Watanabe, K., Ionization potentials of some molecules, J. Chem. Phys. **26**, 542 (1957).

418 Reese, R. M., Dibeler, V. H., and Franklin, J. L., Electron impact studies of sulfur dioxide and sulfuryl fluoride, J. Chem. Phys. **29**, 880 (1958).

419 Lifshitz, C., and Long, F. A., Appearance potentials and mass spectra of fluorinated ethylenes. I. Decomposition mechanisms and their energetics, J. Phys. Chem. **67**, 2463 (1963).

422 Wilkinson, P. G., Absorption spectra and ionization potentials of benzene and benzene-d_6, J. Chem. Phys. **24**, 917 (1956).

423 Wilkinson, P. G., Absorption spectra of benzene and benzene-d_6 in the vacuum ultra-violet, Spectrochim. Acta **8**, 283 (1956).

424 Dibeler, V. H., Franklin, J. L., and Reese, R. M., Electron impact studies of hydrazine and the methyl-substituted hydrazines, J. Am. Chem. Soc. **81**, 68 (1959).

427 Samson, J. A. R., and Cook, G. R., Photoionization of water vapor with mass analysis of ions, Bull. Am. Phys. Soc. **4**, 459 (1959).

431 Higasi, K., Nozoe, T., and Omura, I., Ionization potentials of some organic molecules. IV. Troponoid compounds, Bull. Chem. Soc. Japan **30**, 408 (1957).

439 Marriott, J., and Craggs, J. D., Ionization and dissociation by electron impact. I. Trifluoromethyl halides, J. Electron. **1**, 405 (1956).

440 Marriott, J., and Craggs, J. D., Ionization and dissociation by electron impact. II. Boron trifluoride and boron trichloride, J. Electron. Control **3**, 194 (1957).

441 Farmer, J. B., Henderson, I. H. S., Lossing, F. P., and Marsden, D. G. H., Free radicals by mass spectrometry. IX. Ionization potentials of CF_3 and CCl_3 radicals and bond dissociation energies in some derivatives, J. Chem. Phys. **24**, 348 (1956).

462 Collin, J., and Lossing, F. P., Ionization and dissociation of allene, propyne, 1-butyne, and 1,2- and 1,3-butadienes by electron impact; the $C_3H_3^+$ ion, J. Am. Chem. Soc. **79**, 5848 (1957).

463 Frost, D. C., and McDowell, C. A., Excited states of the molecular ions of hydrogen fluoride, hydrogen iodide, water, hydrogen sulphide, and ammonia, Can. J. Chem. **36**, 39 (1958).

464 Berkowitz, J., and Wexler, S., On the ionization potential of the CH_2 radical, J. Chem. Phys. **37**, 1476 (1962).

473 Fukui, K., Kato, H., and Yonezawa, T., A molecular orbital theory of saturated compounds. I. Ionization potential and bond dissociation energy, Bull. Chem. Soc. Japan **33**, 1197 (1960).

1004 Collin, J. E., Ionization potential of NO_2, Nature **196**, 373 (1962).

1006 Baranov, V. M., and Rebane, T. K., On the semi-empirical calculation of the ionization potentials of aliphatic compounds, Opt. i Spektroskopiya **8**, 268 (1960).

1007 Cullen, W. R., and Frost, D. C., Ionization potentials of some perfluoroalkyl arsines, Can. J. Chem. **40**, 390 (1962).

1011 Palmer, T. F., and Lossing, F. P., Free radicals by mass spectrometry. XXX. Ionization potentials of anilino and 2-, 3-, and 4-pyridylmethyl radicals, J. Am. Chem. Soc. **85**, 1733 (1963).

1012 Kaneko, Y., Ionization efficiency curves for A^+, Kr^+, N_2^+, and CO^+ by electron impact, J. Phys. Soc. Japan **16**, 1587 (1960).

1013 Collin, J. E., L'ionisation et la dissociation du nitrate d'ethyle sous l'impact électronique, et le potentiel d'ionisation du dioxyde d'azote, Bull. Soc. Roy. Sci. Liege **32**, 133 (1963).

1019 Dibeler, V. H., and Reese, R. M., Mass spectrometric study of the photoionization of acetylene and acetylene-d_2, J. Chem. Phys. **40**, 2034 (1964).

1020 Norman, J. H., Staley, H. G., and Bell, W. E., Mass spectrometric study of gaseous oxides of rhodium and palladium, J. Phys. Chem. **68**, 662 (1964).

1022 Nakayama, T., and Watanabe, K., Absorption and photoionization coefficients of acetylene, propyne, and 1-butyne, J. Chem. Phys. **40**, 558 (1964).

1023 Colin, R., and Drowart, J., Thermodynamic study of germanium monotelluride using a mass spectrometer, J. Phys. Chem. **68**, 428 (1964).

1024 Fehlner, T. P., and Koski, W. S., The fragmentation of some boron hydrides by electron impact, J. Am. Chem. Soc. **86**, 581 (1964).

1029 Asundi, R. K., Craggs, J. D., and Kurepa, M. V., Electron attachment and ionization in oxygen, carbon monoxide and carbon dioxide, Proc. Phys. Soc. (London) **82**, 967 (1963).

1032 Nicholson, A. J. C., Photo-ionization efficiency curves. Measurement of ionization potentials and interpretation of fine structure, J. Chem. Phys. **39**, 954 (1963).

1033 Wada, Y., and Kiser, R. W., Mass spectrometric study of phosphine and diphosphine, Inorg. Chem. **3**, 174 (1964).

1035 Berkowitz, J., and Chupka, W. A., Vaporization processes involving sulfur, J. Chem. Phys. **40**, 287 (1964).

1036 Fischler, J., and Halmann, M., Electron-impact studies of phosphorus compounds, J. Chem. Soc. 31 (1964).

1039 Earnshaw, D. G., Cook, G. L., and Dinneen, G. U., A study of selected ions in the mass spectra of benzenethiol and deuterated benzenethiol, J. Phys. Chem. **68**, 296 (1964).

1040 Newton, A. S., Triple ionization in small molecules, J. Chem. Phys. **40**, 607 (1964).

1047 Westmore, J. B., Mann, K. H., and Tickner, A. W., Mass spectrometric study of the nonstoichiometric vaporization of cadmium arsenide, J. Phys. Chem. **68**, 606 (1964).

1050 Frost, D. C., McDowell, C. A., and Vroom, D. A., Photoelectron spectroscopy with a spherical analyzer. The vibrational energy levels of H_2^+, Phys. Rev. Letters **15**, 612 (1965).

1051 Momigny, J., Measurement of molecular excitation potentials by means of an ion source, J. Chem. Phys. **25**, 787 (1956).

1058 Momigny, J., Ionization potentials of cis and trans dichloro- and dibromo-ethylenes, Nature **191**, 1089 (1961).

1059 Godbole, E. W., and Kebarle, O., Ionization and dissociation of deuterated ethyl and isopropyl acetates and ethyl formate under electron impact, Trans. Faraday Soc. **58,** 1897 (1962).
1062 Bibby, M. M., and Carter, G., Ionization and dissociation in some fluorocarbon gases, Trans. Faraday Soc. **59,** 2455 (1963).
1064 Kuroda, H., Ionization potentials of polycyclic aromatic hydrocarbons, Nature **201,** 1214 (1964).
1065 Burns, R. P., DeMaria, G., Drowart, J., and Inghram, M. G., Mass spectrometric investigation of the vaporization of In_2O_3, J. Chem. Phys. **38,** 1035 (1963).
1066 Crable, G. F., and Kearns, G. L., Effect of substituent groups on the ionization potentials of benzenes, J. Phys. Chem. **66,** 436 (1962).
1067 Chelobov, F. N., Dubov, S. S., Tikhomirov, M. I., and Dobrovitskii, M. I., Ionization and dissociation of hexafluoropropylene by electrons of different energies, Dokl. Akad. Nauk SSSR **151,** 631 (1963).
1068 Elder, F. A., Giese, C., Steiner, B., and Inghram, M., Photo-ionization of alkyl free radicals, J. Chem. Phys. **36,** 3292 (1962).
1069 Wacks, M. E., Electron-impact studies of aromatic hydrocarbons. II. Naphthacene, naphthaphene, chrysene, triphenylene, and pyrene, J. Chem. Phys. **41,** 1661 (1964).
1070 Walsh, A. D., and Warsop, P. A., The ultra-violet absorption spectrum of ammonia, Trans. Faraday Soc. **57,** 345 (1961).
1072 Collin, J. E., Ionisation et dissociation du méthane, de la méthylamine et de l'alcool méthylique par des électrons monoénergétiques, Colloq. Spectros. Intern. (9th, Lyons, 1961) **3,** 596 (1962).
1075 Steele, W. C., and Stone, F. G. A., An electron impact study of 1,1,1-trifluoroethane, 1,1,1-trifluoropropane and 3,3,3-trifluoropropene, J. Am. Chem. Soc. **84,** 3450 (1962).
1076 Steele, W. C., Nichols, L. D., and Stone, F. G. A., An electron impact investigation of some organoboron difluorides, J. Am. Chem. Soc. **84,** 1154 (1962).
1077 Kaufman, J. J., The effect of substitution on the ionization potentials of free radicals and molecules. IV. δ_K values for alcohols, ethers, thiols, and sulfides, J. Phys. Chem. **66,** 2269 (1962).
1078 Herzberg, G., The ionization potential of CH_2, Can. J. Phys. **39,** 1511 (1961).
1079 Fisher, I. P., Palmer, T. F., and Lossing, F. P., The vertical ionization potentials of phenyl and phenoxy radicals, J. Am. Chem. Soc. **86,** 2741 (1964).
1091 Price, W. C., and Passmore, T. R., Discussions Faraday Soc. **35,** 232 (1963).
1093 Browne, J. C., Binding energy of LiH^+ and the ionization potential of LiH: mixed basis set calculation, J. Chem. Phys. **41,** 3495 (1964).
1094 McGowan, J. W., Clarke, E. M., Hanson, H. P., and Stebbings, R. F., Electron- and photon-impact ionization of O_2, Phys. Rev. Letters **13,** 620 (1964).
1097 Tanaka, Y., and Jursa, A. S., Higher ionization potentials of NO_2, J. Chem. Phys. **36,** 2493 (1962).
1099 Murad, E., and Inghram, M. G., Thermodynamic properties of the acetyl radical and bond dissociation energies in aliphatic carbonyl compounds, J. Chem. Phys. **41,** 404 (1964).
1100 Munson, M. S. B., and Franklin, J. L., Energetics of some gaseous oxygenated organic ions, J. Phys. Chem. **68,** 3191 (1964).
1101 Halmann, M., and Klein, Y., Electron-impact spectroscopy of phosphorus compounds. Part III. Positive- and negative-ion formation from phosphorus trichloride and phosphoryl chloride, J. Chem. Soc. 4324 (1964).
1102 Hall, L. H., Subbanna, V. V., and Koski, W. S., Ionization and appearance potentials of selected ions from decaborane-16, B_5H_8I and B_5H_8Br, J. Am. Chem. Soc. **86,** 3969 (1964).
1103 Watanabe, K., and Jursa, A. S., Absorption and photoionization cross sections of H_2O and H_2S, J. Chem. Phys. **41,** 1650 (1964).
1104 Ehlert, T. C., Blue, G. D., Green, J. W., and Margrave, J. L., Mass spectrometric studies at high temperatures. IV. Dissociation energies of the alkaline earth monofluorides, J. Chem. Phys. **41,** 2250 (1964).
1105 Green, J. W., Blue, G. D., Ehlert, T. C., and Margrave, J. L., Mass spectrometric studies at high temperatures. III. The sublimation pressures of magnesium, strontium, and barium fluorides, J. Chem. Phys. **41,** 2245 (1964).
1106 Theard, L. P., and Hildebrand, D. L., Heat of formation of $Be_2O(g)$ by mass spectrometry, J. Chem. Phys. **41,** 3416 (1964).
1107 Winters, R. E., and Kiser, R. W., Mass spectrometric studies of chromium, molybdenum, and tungsten hexacarbonyls, Inorg. Chem. **4,** 157 (1965).
1108 Al-Joboury, M. I., May, D. P., and Turner, D. W., Molecular photoelectron spectroscopy. Part III. The ionization potentials of oxygen, carbon monoxide, nitric oxide, and acetylene, J. Chem. Soc. 616 (1965).
1109 Bauer, S. H., Herzberg, G., and Johns, J. W. C., The absorption spectrum of BH and BD in the vacuum ultraviolet, J. Mol. Spectry. **13,** 256 (1964).
1110 Kiser, R. W., and Hobrock, D. L., The ionization potential of carbon tetrafluoride, J. Am. Chem. Soc. **87,** 922 (1965).
1111 Dorman, F. H., Appearance potentials of the fragment ions from CF_3I, J. Chem. Phys. **41,** 2857 (1964).
1112 White, D., Seshadri, K. S., Dever, D. F., Mann, D. E., and Linevski, M. J., Infrared spectra and the structures and thermodynamics of gaseous LiO, Li_2O, and Li_2O_2, J. Chem. Phys. **39,** 2463 (1963).
1114 Price, W. C. and Wood, R. W., The far ultraviolet absorption spectra and ionization potentials of C_6H_6 and C_6D_6, J. Chem. Phys. **3,** 439 (1935).
1115 Amr El-Sayed, M. F., Kasha, M., and Tanaka, Y., Ionization potentials of benzene, hexadeuterobenzene, and pyridine from their observed Rydberg series in the region 600–2000 Å, J. Chem. Phys. **34,** 334 (1961).
1116 Verhaegen, G., Stafford, F. E., and Drowart, J., Mass spectrometric study of the systems boron-carbon and boron-carbon-silicon, J. Chem. Phys. **40,** 1622 (1964).
1118 Dibeler, v. H., Reese, R. M., and Krauss, M., Mass spectrometric study of the photoionization of small molecules, Advan. Mass Spectrometry **3,** 471 (1966).
1119 Fehlner, T. P., and Koski, W. S., Fragmentation of tetraborane by electron impact, J. Phys. Chem. **85,** 1905 (1963).
1120 Steiner, B., Giese, C. F., and Inghram, M. G., Photoionization of alkanes. Dissociation of excited molecular ions, J. Chem. Phys. **34,** 189 (1961).
1121 Briglia, D. D., and Rapp, D., Ionization of the hydrogen molecule by electron impact near threshold, Phys. Rev. Letters **14,** 245 (1965).
1122 Meyer, F., Haynes, P., McLean, S., and Harrison, A. G., An electron impact study of some C_8H_{10} isomers, Can. J. Chem. **43,** 211 (1965).
1124 Norman, J. H., Staley, H. G., and Bell, W. E., Mass-spectrometric study of gaseous oxides of iridium, J. Chem. Phys. **42,** 1123 (1965).
1125 Cotter, J. L., Electron-impact fragmentation patterns of 3,5-diphenyl-1,2,4-oxadiazole and 2,5-diphenyl-1,3,4-oxadiazole, J. Chem. Soc. 5491 (1964).
1126 Cotter, J. L., Electron impact fragmentation patterns of acetanilide and benzamide, J. Chem. Soc. 5477 (1964).
1127 Cotter, J. L., Electron impact studies of some aromatic fluorocarbons, J. Chem. Soc. 1520 (1965).
1128 Dibeler, V. H., Krauss, M., Reese, R. M., and Harllee, F. N., Mass-spectrometric study of photoionization. III. Methane and methane-d_4, J. Chem. Phys. **42,** 3791 (1965).
1129 Beck, D., and Osberghaus, O., Das massenspektrum der Ungeladenen Bruchstücke bei Elektronenbeschuss von Molekülen, Z. Physik **160,** 406 (1960).
1130 Al-Joboury, M. I., and Turner, D. W., Molecular photoelectron spectroscopy. Part II. A summary of ionization potentials, J. Chem. Soc. 4434 (1964).

1131 Jacobson, A., Steigman, J., Strakna, R. A., and Friedland, S. S., Appearance potential study of $CBrF_3$, J. Chem. Phys. **24,** 637 (1956).

1132 Dibeler, V. H., Reese, R. M., and Mohler, F. L., Ionization and dissociation of hexafluorobenzene by electron impact, J. Chem. Phys. **26,** 304 (1957).

1133 Jackson, D. S., and Schiff, H. I., Mass spectrometric investigation of active nitrogen, J. Chem. Phys. **23,** 2333 (1955).

1136 Dibeler, V. H., and Reese, R. M., Selected positive and negative ions in the mass spectra of the monohalomethanes, J. Res. NBS **54,** 127 (1955) RP2573.

1139 Martin, R. H., Lampe, F. W., and Taft, R. W., An electron-impact study of ionization and dissociation in methoxy- and halogen-substituted methanes, J. Am. Chem. Soc. **88,** 1353 (1966).

1140 Vilesov, F. I., and Zaitsev, V. M., Photoionization of phenyl derivatives of group 5 elements, Dokl. Akad. Nauk SSSR **154,** 886 (1964).

1141 Akopyan, M. E., and Vilesov, F. I., Decay of the molecular ions formed in photoionization of hydrazine and some of its alkyl derivatives, Kinetika i Kataliz **4,** 39 (1963).

1142 Vilesov, F. I., Photoionisation of organic vapours in the vacuum ultra-violet, Zh. Fiz. Khim. **35,** 2010 (1961).

1143 Dibeler, V. H., Reese, R. M., and Krauss, M., Mass-spectrometric study of photoionization. II. H_2, HD, and D_2, J. Chem. Phys. **42,** 2045 (1965).

1144 Paulett, G. S., and Lustig, M., Sulfur-nitrogen and oxygen-nitrogen bond dissociation energies of some *N*-fluorinated amines, J. Am. Chem. Soc. **87,** 1020 (1965).

1145 Natalis, P., Étude du comportement d'isomères géométriques sous l'impact électronique. V. Comparaison des données obtenues, par différentes méthodes, pour les 1,2-diméthylcyclohexanes cis et trans, Bull. Soc. Chim. Belges **73,** 961 (1964).

1146 Natalis, P., and Laune, J., Étude du comportement d'isomères géométriques sous l'impact électronique. IV. Cyclopropane, méthylcyclopropane et diméthylcyclopropanes gem, cis et trans, Bull. Soc. Chim. Belges **73,** 944 (1964).

1147 Akopyan, M. E., Vilesov, F. I., and Terenin, A. N., A mass-spectroscopic study of the spectral dependence of the efficiency of photoionization of benzene derivatives, Dokl. Akad. Nauk. SSSR **140,** 1037 (1961).

1148 Dressler, K., and Miescher, E., Absorption spectrum of the NO molecule. V. Survey of excited states and their interactions, Astrophys. J. **141,** 1266 (1965).

1149 Dawton, R. H. V. M., and Wilkinson, K. L., Plutonium: evaporation tests, ionisation potential and electron emission, Report No. A. E. R. E. GP/R 1906, Atomic Energy Research Establishment, Harwell (1956).

1155 Drowart, J., Burns, R. P., DeMaria, G., and Inghram, M. G., Mass spectrometric study of carbon vapor, J. Chem. Phys. **31,** 1131 (1959).

1159 Kurbatov, B. L., Vilesov, F. I., and Terenin, A. N., Kinetic energy distribution of electrons during the photoionization of methyl derivatives of benzene, Dokl. Akad. Nauk SSSR **140,** 797 (1961).

1160 Akopyan, M. E., and Vilesov, F. I., Excited states of positive ions and dissociative photoionization of aromatic amines, Dokl. Akad. Nauk SSSR **158,** 1386 (1964).

1164 Melton, C. E., and Joy, H. W., Calculated ionization potential of chloro- and fluoromethanes, tetrafluoromethane (CF_4), xenon tetrafluoride (XeF_4), and xenon tetrachloride ($XeCl_4$), J. Chem. Phys. **42,** 2982 (1965).

1165 Alekseev, N. I., and Kaminskii, D. L., Ionization of some rare earth elements on the surfaces of tungsten, rhenium, and iridium, Zh. Tekhn. Fiz. **34,** 1521 (1964).

1166 Vilesov, F. I., and Terenin, A. N., The photoionization of the vapors of certain organic compounds, Dokl. Akad. Nauk SSSR **115,** 744 (1957).

1167 Vilesov, F. I., and Kurbatov, B. L., Photoionization of esters and metal carbonyls in the gaseous phase, Dokl. Akad. Nauk SSSR **140,** 1364 (1961).

1168 Cotter, J. L., Electron-impact fragmentation of pentafluorobenzamide, J. Chem. Soc. 5742 (1965).

1172 Momigny, J., Mesure de potentiels d'excitation moleculaires au moyen d'une source d'ions, Bull. Soc. Chim. Belges 66, **33** (1957).

1179 Tanaka, Y., and Ogawa, M., Rydberg absorption series of CO_2 converging to the $^2\Pi_u$ state of CO_2^+, Can. J. Phys. **40,** 879 (1962).

1182 Natalis, P., Note sur le comportement des isomères cis et trans de la décaline soumis a l'impact électronique, Bull. Soc. Roy. Sci. Liege **31,** 803 (1962).

1183 Natalis, P., Behaviour of cis and trans isomers of decaline under electron impact, Nature **197,** 284 (1963).

1184 Natalis, P., Étude du comportement d'isomères géométrique sous l'impact électronique. II. Les cis et trans hexahydroindanes, Bull. Soc. Chim. Belges **72,** 374 (1963).

1185 Momigny, J., and Wirtz-Cordier, A. M., Les effets de l'impact électronique sur des dérivés dihalogénés du benzène, Ann. Soc. Sci. Bruxelles **76,** 164 (1962).

1189 Hudson, R. D., Measurements of the molecular absorption cross section and the photoionization of sodium vapor between 1600 and 3700 Å, J. Chem. Phys. **43,** 1790 (1965).

1190 Momigny, J., Les potentiels d'ionisation des dihalogénoéthylènes cis et trans, Bull. Classe Sci. Acad. Roy. Belg. **46,** 686 (1960).

1197 Momigny, J., Brakier, L., and D'Or, L., Comparaison entre les effets de l'impact électronique sur le benzène et sur les isomères du benzène en chaîne ouverte, Bull. Classe Sci. Acad. Roy. Belg. **48,** 1002 (1962).

1211 Collin, J., and Nagels, M., Ionization potential and molecular complex of benzothiazol with iodine, Nature **190,** 82 (1961).

1217 Huber, K. P., Die Rydberg-Serien im absorptionsspektrum des NO-moleküls, Helv. Phys. Acta **34,** 929 (1961).

1235 Cook, G. R., and Ching, B. K., Photoionization and absorption cross sections and fluorescence of CF_4, J. Chem. Phys. **43,** 1794 (1965).

1237 Natalis, P., and Franklin, J. L., Ionization and dissociation of diphenyl and condensed ring aromatics by electron impact. II. Diphenylcarbonyls and ethers, J. Phys. Chem. **69,** 2943 (1965).

1238 Natalis, P., and Franklin, J. L., Ionization and dissociation of diphenyl and condensed ring aromatics by electron impact. I. Biphenyl, diphenylacetylene, and phenanthrene, J. Phys. Chem. **69,** 2935 (1965).

1240 Stuber, F. A., Multiple ionization in neon, argon, krypton, and xenon, J. Chem. Phys. **42,** 2639 (1965).

1241 Collin, J., Ionization and dissociation of molecules by monoenergetic electrons. III. On the existence of a bent excited state of NO_2^+, J. Chem. Phys. **30,** 1621 (1959).

1243 Colin, R., Drowart, J., and Verhaegen, G., Mass-spectrometric study of the vaporization of tin oxides. Dissociation energy of SnO, Trans. Faraday Soc. **61,** 1364 (1965).

1244 Verhaegen, G., Colin, R., Exsteen, G., and Drowart, J., Mass spectrometric determination of the stability of gaseous molybdites, tungstites, molybdates and tungstates of magnesium, calcium, strontium, and tin, Trans. Faraday Soc. **61,** 1372 (1965).

1245 Drowart, J., Colin, R., and Exsteen, G., Mass-spectrometric study of the vaporization of lead monoxide. Dissociation energy of PbO, Trans. Faraday Soc. **61,** 1376 (1965).

1246 Thorburn, R., Ionization and dissociation by electron impact in carbon tetrabromide, Brit. J. Appl. Phys. **16,** 1397 (1965).

1249 Kent, R. A., and Margrave, J. L., Mass spectrometric studies at high temperatures. VII. The sublimation pressure of chromium(II) fluoride and the dissociation energy of chromium(I) fluoride, J. Am. Chem. Soc. **87,** 3582 (1965).

1251 McGowan, J. W., and Fineman, M. A., Rotational structure at threshold in the H_2^+ electron-impact ionization spectrum, Phys. Rev. Letters **15,** 179 (1965).

1252 Pottie, R. F., Ionization potential and heat of formation of the difluoromethylene radical, J. Chem. Phys. **42**, 2607 (1965).

1253 Nicholson, A. J. C., Photoionization-efficiency curves. II. False and genuine structure, J. Chem. Phys. **43**, 1171 (1965).

1254 Hatada, M., and Hirota, K., The ionization and dissociation of aliphatic ketones under electron impact. II. Methyl-sec-butylketone and methyl-tert-butylketone, Z. Physik. Chem. (Frankfurt) **44**, 328 (1965).

1255 Drowart, J., Degreve, F., Verhaegen, G., and Colin, R., Thermochemical study of the germanium oxides using a mass spectrometer. Dissociation energy of the molecule GeO, Trans. Faraday Soc. **61**, 1072 (1965).

1256 Hatada, M., and Hirota, K., The ionization and dissociation of methyl butyl ketones under electron impact. I. Methyl *n*-butyl ketone and methyl isobutyl ketone, Bull. Chem. Soc. Japan **38**, 599 (1965).

1264 Olmsted, J., III, Street, K., Jr., and Newton, A. S., Excess-kinetic-energy ions in organic mass spectra, J. Chem. Phys. **40**, 2114 (1964).

1268 Lefebvre-Brion, H., and Moser, C. M., Calculation of Rydberg levels in NO and BF, J. Mol. Spectry. **15**, 211 (1965).

1280 Kent, R. A., and Margrave, J. L., Mass spectrometric studies at high temperatures. VIII. The sublimation pressure of iron(II) fluoride, J. Am. Chem. Soc. **87**, 4754 (1965).

1281 Farrell, P. G., and Newton, J., Ionization potentials of aromatic amines, J. Phys. Chem. **69**, 3506 (1965).

1284 Dillard, J. G., and Kiser, R. W., Ionization and dissociation of ruthenium and osmium tetroxides, J. Phys. Chem. **69**, 3893 (1965).

1286 Murakawa, K., The ionization potential of Tm I, J. Phys. Soc. Japan **20**, 1733 (1965).

1288 Lifshitz, C., and Long, F. A., Appearance potentials and mass spectra of fluorinated ethylenes. II. Heats of formation of fluorinated species and their positive ions, J. Phys. Chem. **69**, 3731 (1965).

1290 Lifshitz, C., and Long, F. A., Appearance potentials and mass spectra of C_3F_6, C_3F_5Cl, and *c*-C_3F_6, J. Phys. Chem. **69**, 3741 (1965).

1297 Hildenbrand, D. L., and Murad, E., Dissociation energy of boron monofluoride from mass-spectrometric studies, J. Chem. Phys. **43**, 1400 (1965).

1315 Bloor, J. E., Semiempirical SCF calculations on azulene and its singly charged ions, Can. J. Chem. **43**, 3026 (1965).

1352 Lorquet, J. C., The electronic structure of ionized molecules. II. Alkanes, Mol. Phys. **9**, 101 (1965).

1372 Martignoni, P., Morgan, R. L., and Cason, C., Rapid determination of electron impact ionization and appearance potentials, Rev. Sci. Instr. **36**, 1783 (1965).

1381 Winters, R. E., and Kiser, R. W., Ions produced in the mass spectrometer from cyclopentadienylmetal carbonyl compounds of cobalt, manganese and vanadium, J. Organometal. Chem. **4**, 190 (1965).

1382 Cook, G. R., Metzger, P. H., and Ogawa, M., Photoionization and absorption coefficients of CO in the 600 to 1000 Å region, Can. J. Phys. **43**, 1706 (1965).

1390 Baldwin, M., Maccoll, A., Kirkien-Konasiewicz, A., and Saville, B., Ionisation potentials of the *N*-methylated thioureas, Chem. Ind. 286 (1966).

1399 Dibeler, V. H., and Walker, J. A., Ion-pair process in CH_3Cl by photoionization, J. Chem. Phys. **43**, 1842 (1965).

1400 Botter, R., Dibeler, V. H., Walker, J. A., and Rosenstock, H. M., Experimental and theoretical studies of photoionization-efficiency curves for C_2H_2 and C_2D_2, J. Chem. Phys. **44**, 1271 (1966).

1404 Dorman, F. H., Fragment ions from CH_3CHO and $(CH_3)_2CO$ by electron impact, J. Chem. Phys. **42**, 65 (1965).

1406 Momigny, J., Urbain, J., and Wankenne, H., Les effects de l'impact électronique sur la pyridine et les diazines isomères, Bull. Soc. Roy. Sci. Liege **34**, 337 (1965).

1407 Fehlner, T. P., The identification of the P_2H_2 molecule in the pyrolysis of diphosphine, J. Am. Chem. Soc. **88**, 1819 (1966).

1408 Ehrhardt, H., and Tekaat, T., Auftrittspotentialmessungen an Ionisierten Molekülbruchstücken mit Kinetischer Anfangsenergie, Z. Naturforsch. **19a**, 1382 (1964).

1413 Harrison, A. G., and Jones, E. G., Rearrangement reactions following electron impact on ethyl and isopropyl esters, Can. J. Chem. **43**, 960 (1965).

1414 Waddington, T. C., Lattice energies of phosphonium bromide and iodide and the proton affiinity of phosphine, Trans. Faraday Soc. **61**, 2652 (1965).

1415 Doolittle, P. H., and Schoen, R. I., Electron retarding potential studies of photoionization, Report No. D1–82–0463, Boeing Scientific Research Laboratories, Seattle (1965).

1418 Dewar, M. J. S., and Rona, P., Doubly charged ions in the mass spectra of some organoboron derivatives, J. Am. Chem. Soc. **87**, 5510 (1965).

1419 Lifshitz, C., and Long, F. A., Some observations concerning the positive ion decomposition of C_2F_6 and C_3F_8 in the mass spectrometer, J. Phys. Chem. **69**, 3746 (1965).

1420 Clark, L. B., Ionization potential of azulene, J. Chem. Phys. **43**, 2566 (1965).

1421 Hess, G. G., Lampe, F. W., and Sommer, L. H., An electron impact study of ionization and dissociation of trimethylsilanes, J. Am. Chem. Soc. **87**, 5327 (1965).

1424 Yergey, A. L., and Lampe, F. W., An electron impact study of the bond dissociation energies of some trimethyltin compounds, J. Am. Chem. Soc. **87**, 4204 (1965).

1439 Melton, C. E., and Joy, H. W., Ionization potentials of alkyl free radicals and *n*-alkanes through $C_{17}H_{36}$ by energy-calibrated molecular orbital methods, Can. J. Chem. **44**, 1455 (1966).

1441 Radwan, T. N., and Turner, D. W., Molecular photoelecyron spectroscopy. Part V. Ozone, J. Chem. Soc. (A), 85 (1966).

1448 Camus, P., and Blaise, J., Nouvelle détermination du potentiel d'ionisation du spectre d'arc du thulium, Compt. Rend. **261**, 4359 (1965).

1451 Dorman, F. H., Second differential ionization-efficiency curves for fragment ions by electron impact, J. Chem. Phys. **43**, 3507 (1965).

1455 Fisher, I. P., and Heath, G. A., Dissociation energy of the N—H bond in hydrazine, Nature **208**, 1199 (1965).

1458 Kent, R. A., McDonald, J. D., and Margrave, J. L., Mass spectrometric studies at high temperatures. IX. The sublimation pressure of copper(II) fluoride, J. Phys. Chem. **70**, 874 (1966).

1459 Kitagawa, T., Harada, Y., Inokuchi, H., and Kodera, K., Absorption spectrum of vapor phase azulene in vacuum ultraviolet region, J. Mol. Spectry. **19**, 1 (1966).

2001 Platel, G., Mesures des potentiels d'apparition des ions obtenus par impact électronique dans la phase vapeur des iodures alcalins et des mélanges LiI–MI, J. Chim. Phys. **62**, 1176 (1965).

2002 Saalfeld, F. E., and Svec, H. J., Mass spectra of volatile hydrides. IV. Silylgermane, J. Phys. Chem. **70**, 1753 (1966).

2009 Kent, R. A., Zmbov, K. F., Kana'an, A. S., Besenbruch, G., McDonald, J. D., and Margrave, J. L., Mass spectrometric studies at high temperatures. X. The sublimation pressures of scandium(III), yttrium(III) and lanthanum(III), trifluorides, J. Inorg. Nucl. Chem. **28**, 1419 (1966).

2013 Brehm, B., Massenspektrometrische Untersuchung der Photoionisation von Molekülen, Z. Naturforsch. **21a**, 196 (1966).

2014 Dorman, F. H., Morrison, J. D., and Nicholson, A. J. C., Threshold law for the probability of excitation by electron impact, J. Chem. Phys. **32**, 378 (1960).

2015 May, D. P., and Turner, D. W., The higher ionization potentials of chlorobenzene, Chem. Commun. 199 (1966).

2016 Cuthbert, J., Farren, J., Prahallada Rao, B. S., and Preece, E. R., Appearance potentials and transition probabili-

ties for electron impact ionization of CO and CO^+, Proc. Phys. Soc. (London) **88,** 91 (1966).
2018 Tsuda, S., and Hamill, W. H., Ionization efficiency measurements by the retarding potential difference method, Advan. Mass Spectrometry **3,** 249 (1966).
2020 Lorquet, J. C., A theoretical study of the ionization of alkanes, Advan. Mass Spectrometry **3,** 443 (1966).
2021 Appell, J., Durup, J., and Heitz, F., Sur le seuil d'apparition des ions fragments produits avec exces d'energie cinetique, Advan. Mass Spectrometry **3,** 457 (1966).
2022 Botter, R., Hagemann, R., Nief, G., and Roth, E., Etude thermodynamique de l'hemioxyde de soufre par spectrometrie de masse, Advan. Mass Spectrometry **3,** 951 (1966).
2023 Foffani, A., Pignataro, S., Cantone, B., and Grasso, F., Mass spectra of metal hexacarbonyls, Z. Physik. Chem. (Frankfurt) **45,** 79 (1965).
2025 Pignataro, S., Foffani, A., Innorta, G., and Distefano, G., Molecular structural effects on the ionization potentials for metasubstituted aromatic compounds and for compounds of the type $X-CH_2-R$, Z. Physik. Chem. (Frankfurt) **49,** 291 (1966).
2026 Foffani, A., Pignataro, S., Cantone, B., and Grasso, F., Ionization potentials and substituent effects for aromatic carbonyl compounds, Z. Physik. Chem. (Frankfurt) **42,** 221 (1964).
2027 Dibeler, V. H., and Walker, J. A., Photoionization efficiency curve for SF_6 in the wavelength region 1050 to 600 Å, J. Chem. Phys. **44,** 4405 (1966).
2028 Natalis, P., Effect of geometrical isomerism on the behaviour of cis and trans hexahydroindanes under electron impact, Nature **200,** 881 (1963).
2029 Lorquet-Julien, J. C., Comportement du 1 fluoro- et du 1 chloropentane normal et des dérivés halogénés correspondants du cyclopentane sous l'impact électronique, Bull. Soc. Roy. Sci. Liege **30,** 170 (1961).
2030 Fehlner, T. P., and Koski, W. S., Direct detection of the borane molecule and the boryl radical by mass spectrometry, J. Am. Chem. Soc. **86,** 2733 (1964).
2031 Collin, J. E., Relations between charge-transfer spectra and ionization potentials of some electron-donor organic molecules, Z. Elektrochem. **64,** 936 (1960).
2032 Asundi, R. K., and Kurepa, M. V., Ionization cross sections in He, Ne, A, Kr, and Xe by electron impact, J. Electron. Control **15,** 41 (1963).
2033 Comes, F. J., and Lessmann, W., Messung von Anregungszuständen des Stickstoffmoleküls mit hilfe der Photoionisation, Z. Naturforsch. **16a,** 1038 (1961).
2034 Comes, F. J., and Lessmann, W., Neue Anregungszustände des Argons Oberhalb der Ionisationsgrenze $^2P_{3/2}$, Z. Naturforsch. **16a,** 1396 (1961).
2036 Finan, P. A., Reed, R. I., Snedden, W., and Wilson, J. M., Electron impact and molecular dissociation. Part X. Some studies of glycosides, J. Chem. Soc. 5945 (1963).
2037 Finch, A. C. M., Charge-transfer spectra and the ionization energy of azulene, J. Chem. Soc. 2272 (1964).
2038 Fueki, K., Electronic states of positive ions, J. Phys. Chem. **68,** 2656 (1964).
2040 Hildebrand, D. L., Theard, L. P., and Saul, A. M., Transpiration and mass spectrometric studies of equilibria involving BOF(g) and $(BOF)_3$(g), J. Chem. Phys. **39,** 1973 (1963).
2045 Wada, Y., and Kiser, R. W., A mass spectrometric study of some alkyl-substituted phosphines, J. Phys. Chem. **68,** 2290 (1964).
2047 Dibeler, V. H., Reese, R. M., and Franklin, J. L., Ionization and dissociation of oxygen difluoride by electron impact, J. Chem. Phys. **27,** 1296 (1957).
2048 Samson, J. A. R., and Cairns, R. B., Ionization potential of O_2, J. Opt. Soc. Am. **56,** 769 (1966).
2049 Cubicciotti, D., Mass spectrometric study of the vapors over bismuth-sulfur melts, J. Phys. Chem. **67,** 1385 (1963).
2050 Inghram, M. G., Chupka, W. A., and Berkowitz, J., Thermodynamics of the Ta-O system: The dissociation energies of TaO and TaO_2, J. Chem. Phys. **27,** 569 (1957).
2052 Stafford, F. E., and Berkowitz, J., Mass-spectrometric study of the reaction of water vapor with solid barium oxide, J. Chem. Phys. **40,** 2963 (1964).
2053 Svec, H. J., and Flesch, G. D., Thermochemical properties of xenon difluoride and xenon tetrafluoride from mass spectra, Science **142,** 954 (1963).
2054 Gingerich, K. A., and Lee, P. K., Mass spectrometric study of the vaporization of uranium monophosphide, J. Chem. Phys. **40,** 3520 (1964).
2055 Connor, J. A., Finney, G., Leigh, G. J., Haszeldine, R. N., Robinson, P. J., Sedgwick, R. D., and Simmons, R. F., Bond dissociation energies in organosilicon compounds, Chem. Commun. 178 (1966).
2056 Bloom, H., and Hastie, J. W., Vapour phase composition above molten salt mixtures: A mass spectrometric study, Australian J. Chem. **19,** 1003 (1966).
2059 Zelikoff, M., and Watanabe, K., Absorption coefficients of ethylene in the vacuum ultraviolet, J. Opt. Soc. Am. **43,** 756 (1953).
2060 Sjogren, H., Ionization potentials, Arkiv Fysik **22,** 437 (1962).
2063 Colin, R., and Drowart, J., Thermodynamic study of tin selenide and tin telluride using a mass spectrometer, Trans. Faraday Soc. **60,** 673 (1964).
2064 Price, W. C., The far ultraviolet absorption spectra and ionization potentials of the alkyl halides. Part I, J. Chem. Phys. **4,** 539 (1936).
2065 Price, W. C., The far ultraviolet absorption spectra and ionization potentials of the alkyl halides. Part II, J. Chem. Phys. **4,** 547 (1936).
2066 Lindeman, L. P., and Guffy, J. C., Determination of the O—O bond energy in hydrogen peroxide by electron impact, J. Chem. Phys. **29,** 247 (1958).
2095 Beutler, H., and Junger, H.-O., Über das Absorptionsspektrum des Wasserstoffs. III. Die Autoionisierung im Term $3p\pi\,^1\Pi_u$ des H_2 und Ihre Auswahlgesetze. Bestimmung der Ionisierungsenergie des H_2, Z. Physik **100,** 80 (1936).
2098 Krupenie, P. H., The band spectrum of carbon monoxide, Natl. Stand. Ref. Data Ser., Natl. Bur. Stand. NSRDS-NBS 5 (1966).
2099 Namioka, T., Ogawa, M., and Tanaka, Y., The $b^4\Sigma_g^- \leftarrow X^3\Sigma_g^-$ Rydberg series of the oxygen molecule, Proc. Intern. Symp. Mol. Struct. Spectry., Tokyo, B208–1 (1962).
2100 Lofthus, A., The molecular spectrum of nitrogen, Spectroscopic Report No. 2, University of Oslo, Blindern, Norway (1960).
2101 Lampe, F. W., and Field, F. H., The decomposition of neopentane under electron impact, J. Am. Chem. Soc. **81,** 3238 (1959).
2102 Field, F. H., Franklin, J. L., and Lampe, F. W., Reactions of gaseous ions. II. Acetylene, J. Am. Chem. Soc. **79,** 2665 (1957).
2103 Momigny, J., Détermination et discussion des potentiels d'apparition d'ions fragmentaires dans le benzene et ses dérivés monohalogénés, Bull. Soc. Roy. Sci. Liege **28,** 251 (1959).
2105 Kybett, B. D., Carroll, S., Natalis, P., Bonnell, D. W., Margrave, J. L., and Franklin, J. L., Thermodynamic properties of cubane, J. Am. Chem. Soc. **88,** 626 (1966).
2108 Meyerson, S., and Rylander, P. N., Organic ions in the gas phase. IV. $C_7H_7^+$ and $C_5H_5^+$ ions from alkylbenzenes and cycloheptatriene, J. Chem. Phys. **27,** 901 (1957).
2109 Meyerson, S., McCollum, J. D., and Rylander, P. N., Organic ions in the gas phase. VIII. Bicycloheptadiene, J. Am. Chem. Soc. **83,** 1401 (1961).
2112 Van Brunt, R. J. and Wacks, M. E., Electron-impact studies of aromatic hydrocarbons. III. Azulene and naphthalene, J. Chem. Phys. **41,** 3195 (1964).
2113 Moore, C. E., Atomic energy levels, NBS Circ. 467, Vols. **1** (1949), **2** (1952), **3** (1958).
2114 Field, F. H., and Franklin, J. L., Electron Impact Phenomena and the Properties of Gaseous Ions (Academic Press, New York, 1957).
2116 Saalfeld, F. E., and Svec, H. J., The mass spectra of volatile hydrides. I. The monoelemental hydrides of the

group IVB and VB elements, Inorg. Chem. **2**, 46 (1963).

2123 Drowart, J., Exsteen, G., and Verhaegen, G., Mass spectrometric determination of the dissociation energy of the molecules MgO, CaO, SrO and Sr_2O, Trans. Faraday Soc **60**, 1920 (1964).

2125 McKinley, J. D., Mass-spectrometric investigation of the high-temperature reaction between nickel and chlorine, J. Chem. Phys. **40**, 120 (1964).

2126 DeMaria, G., Burns, R. P., Drowart, J., and Inghram, M. G., Mass spectrometric study of gaseous molybdenum, tungsten, and uranium oxides, J. Chem. Phys. **32**, 1373 (1960).

2127 Grimley, R. T., Burns, R. P., and Inghram, M. G., Mass-spectrometric study of the osmium-oxygen system, J. Chem. Phys. **33**, 308 (1960).

2128 Drowart, J., DeMaria, G., Burns, R. P., and Inghram, M. G., Thermodynamic study of Al_2O_3 using a mass spectrometer, J. Chem. Phys. **32**, 1366 (1960).

2129 Burns, R. P., DeMaria, G., Drowart, J., and Grimley, R. T., Mass spectrometric investigation of the sublimation of molybdenum dioxide, J. Chem. Phys. **32**, 1363 (1960).

2130 Grimley, R. T., Burns, R. P. and Inghram, M. G., Thermodynamics of the vaporization of Cr_2O_3: Dissociation energies of CrO, CrO_2, and CrO_3, J. Chem. Phys. **34**, 664 (1961).

2131 Norman, J. H., and Staley, H. G., Thermodynamics of the dimerization and trimerization of gaseous tungsten trioxide and molybdenum trioxide, J. Chem. Phys. **43**, 3804 (1965).

2132 McKinley, J. D., Mass spectrum of yttrium chloride vapor, J. Chem. Phys. **42**, 2245 (1965).

2133 Saalfeld, F. E., and Svec, H. J., The mass spectra of volatile hydrides. II. Some higher hydrides of the group IVB and VB elements, Inorg. Chem. **2**, 50 (1963).

2136 Franklin, J. L., and Munson, M. S. B., Ion-molecule reactions in methane-oxygen and acetylene-oxygen systems, Symp. Combust. (10th, Cambridge, 1964), 561 (1965).

2137 Saalfeld, F. E., and Svec., H. J., The mass spectrum of stannane, J. Inorg. Nucl. Chem. **18**, 98 (1961).

2138 DeMaria, G., Drowart, J., and Inghram, M. G., Thermodynamic study of InSb with a mass spectrometer, J. Chem. Phys. **31**, 1076 (1959).

2139 Colin, R., and Drowart, J., Thermodynamic study of tin sulfide and lead sulfide using a mass spectrometer, J. Chem. Phys. **37**, 1120 (1962).

2140 Buchler, A., Blackburn, P. E., and Stauffer, J. L., The vaporization of rhenium trichloride and rhenium tribromide, J. Phys. Chem. **70**, 685 (1966).

2141 Hildenbrand, D. L., and Murad, E., Mass-spectrometric determination of the dissociation energy of beryllium monofluoride, J. Chem. Phys. **44**, 1524 (1966).

2142 Hildenbrand, D. L., and Theard, L. P., Effusion studies, mass spectra, and thermodynamics of beryllium fluoride vapor, J. Chem. Phys. **42**, 3230 (1965).

2143 Malone, T. J., and McGee, H. A., Jr., Ionization potentials of the dioxygen fluoride free radical and the dioxygen difluoride molecule, J. Phys. Chem. **70**, 316 (1966).

2144 Meyer, F., and Harrison, A. G., A mechanism for tropylium ion formation by electron impact, J. Am. Chem. Soc. **86**, 4757 (1964).

2145 Berkowitz, J., Heat of formation of the CN radical, J. Chem. Phys. **36**, 2533 (1962).

2146 Baldwin, M., Maccoll, A., and Miller, S. I., Appearance potentials of the lower chloroalkanes, J. Am. Chem. Soc. **86**, 4498 (1964).

2148 Ehlert, T. C., and Margrave, J. L., The heat of atomization of aluminum difluoride, J. Am. Chem. Soc. **86**, 3901 (1964).

2149 Johns, J. W. C., and Barrow, R. F., The band spectrum of silicon monofluoride, SiF, Proc. Phys. Soc. (London) **71**, 476 (1958).

2150 Barrow, R. F., and Rowlinson, H. C., The absorption spectra of the gaseous monoxides of silicon, germanium and tin in the Schumann region, Proc. Roy. Soc. (London) **A224**, 374 (1954).

2151 DeMaria, G., Guido, M., Malaspina, L., and Pesce, B., Mass-spectrometric study of the yttrium-carbon system, J. Chem. Phys. **43**, 4449 (1965).

2152 DeMaria, G., Gingerich, K. A., Malaspina, L., and Piacente, V., Dissociation energy of the gaseous AlP molecule, J. Chem. Phys. **44**, 2531 (1966).

2153 King, A. B., Mass-spectral fragmentation of phenyl-*n*-alkanes, J. Chem. Phys. **42**, 3526 (1965).

2154 Tsuda, S., Melton, C. E., and Hamill, W. H., Ionization-efficiency curves for molecular and fragment ions from methane and the methyl halides, J. Chem. Phys. **41**, 689 (1964).

2155 Steele, W. C., Jennings, B. H., Botyos, G. L., and Dudek, G. O., An electron impact study of norbornenyl and nortricyclyl chlorides, J. Org. Chem. **30**, 2886 (1965).

2156 Cotter, J. L., The mass spectra of some fluorine-containing 1,3,4-oxadiazoles, J. Chem. Soc. 6842 (1965).

2157 Bibby, M. M., Toubelis, B. J., and Carter, G., Ionisation and dissociation in CF_4, Electron. Letters **1**, 50 (1965).

2158 Melton, C. E., and Hamill, W. H., Ionization potentials of alkyl free radicals and of benzene, toluene, and triethylamine by the RPD technique, J. Chem. Phys. **41**, 3464 (1964).

2159 Khvostenko, V. I., and Sultanov, A. Sh., Ionisation of thallium(I) chloride, bromide, and iodide molecules by electron bombardment, Zh. Fiz. Khim, **39**, 475 (1965).

2160 Steele, W. C., Appearance potentials of the difluoromethylene positive ion, J. Phys. Chem. **68**, 2359 (1964).

2161 Kent, R. A., Ehlert, T. C., and Margrave, J. L., Mass spectrometric studies at high temperatures. V. The sublimation pressure of manganese(II) fluoride and the dissociation energy of manganese(I) fluoride, J. Am. Chem. Soc. **86**, 5090 (1964).

2162 Ehlert, T. C., Kent, R. A., and Margrave, J. L., Mass spectrometric studies at high temperatures. VI. The sublimation pressure of nickel(II) fluoride, J. Am. Chem. Soc. **86**, 5093 (1964).

2163 Meyer, F., and Harrison, A. G., Ionization potentials of methyl-substituted benzenes and cyclopentadienes, Can. J. Chem. **42**, 2256 (1964).

2164 Fisher, I. P., Homer, J. B., and Lossing, F. P., Free radicals by mass spectrometry. XXXIII. Ionization potentials of CF_2, CF_3CF_2, CF_3CH_2, *n*-C_3F_7, and *i*-C_3F_7 radicals, J. Am. Chem. Soc. **87**, 957 (1965).

2165 Blue, G. D., Green, J. W., Bautista, R. G., and Margrave, J. L., The sublimation pressure of calcium(II) fluoride and the dissociation energy of calcium(I) fluoride, J. Phys. Chem, **67**, 877 (1963).

2166 Khvostenko, V. I., Ionisation of thiophen and some of its derivatives by electron impact, Zh. Fiz. Khim. **36**, 384 (1962).

2167 Ackermann, R. J., Rauh, E. G., and Thorn, R. J., Thermodynamic properties of gaseous yttrium monoxide. Correlation of bonding in group III transition-metal monoxides, J. Chem. Phys. **40**, 883 (1964).

2168 Boudreaux, E. A., Electronic structure and spectrum of XeF_4. A semiempirical MO treatment, J. Chem. Phys. **40**, 246 (1964).

2169 Hernandez, G. J., Vacuum-ultraviolet absorption spectra of the cyclic ethers: Trimethylene oxide, tetrahydrofuran, and tetrahydropyran, J. Chem. Phys. **38**, 2233 (1963).

2170 Hernandez, G. J., Vacuum ultraviolet absorption spectrum of dimethyl ether, J. Chem. Phys. **38**, 1644 (1963).

2171 Gillis, R. G., and Occolowitz, J. L., Isocyanides. III. Electron impact study of aliphatic isocyanides, J. Org. Chem. **28**, 2924 (1963).

2172 Hagemann, R., Détermination de la chaleur de formation de S_2O par spectrométrie de masse, Compt. Rend. **255**, 1102 (1962).

2173 Akopyan, M. E., Vilesov, F. I., and Terenin, A. N., Mass-

spectrometric investigation of photoionization of molecules and dissociation of excited molecular ions, Izv. Akad. Nauk SSSR, Ser. Fiz. **27,** 1083 (1963).

2174 Foffani, A., Pignataro, S., Cantone, B., and Grasso, F., Mass spectra of diazocompounds. I. Diazocarbonyl compounds, Nuovo Cimento **29,** 918 (1963).

2175 Sholette, W. P., and Porter, R. F., Mass spectrometric study of high temperature reactions in the boron-hydrogen-oxygen system, J. Phys. Chem. **67,** 177 (1963).

2176 Verhaegen, G., Stafford, F. E., Ackerman, M., and Drowart, J., Mass spectrometric investigation of gaseous species in the system boron-carbon, Nature **193,** 1280 (1962).

2177 Hassan. G. E. M. A., The atomic spectrum of neodymium. I. Preliminary analysis and ionization potential of Nd I, Physica **29,** 1119 (1963).

2178 Mesnard, G., Uzan, R., and Cabaud, B., Potentiels d'apparition des ions obtenus dans un spectromètre de masse à partir d'oxydes alcalino-terreux, Cahiers Phys. **17,** 333 (1963).

2179 Berkowitz, J., Tasman, H. A., and Chupka, W. A., Double-oven experiments with lithium halide vapors, J. Chem. Phys. **36,** 2170 (1962).

2180 Fineman, M. A., and Petrocelli, A. W., Electron impact study of CO using a Lozier apparatus, J. Chem. Phys. **36,** 25 (1962).

2181 Wilson, E. G., Jortner, J., and Rice, S. A., A far-ultraviolet spectroscopic study of xenon difluoride, J. Am. Chem. Soc. **85,** 813 (1963).

2182 Steele, W. C., Nichols, L. D., and Stone, F. G. A., The determination of silicon-carbon and silicon-hydrogen bond dissociation energies by electron impact, J. Am. Chem. Soc. **84,** 4441 (1962).

2183 Steele, W. C., and Stone, F. G. A., Silicon-silicon bond dissociation energies in disilane and hexachlorodisilane, J. Am. Chem. Soc. **84,** 3599 (1962).

2184 Kaufman, J. J., The effect of substitution on the ionization potentials of free radicals and molecules. III. Estimation of the ionization potentials of cycloalkyl radicals and cyclic amines by δ_K values, J. Am. Chem. Soc. **84,** 4393 (1962).

2185 Dolejsek, Z., Hanus, V., and Prinzbach, H., Das Massenspektrometrische Verhalten von Quadricyclen, Angew. Chem. **74,** 902 (1962).

2186 Blaise, J., and Vetter, R., Détermination du potentiel d'ionisation du spectre d'arc du thulium, Compt. Rend. **256,** 630 (1963).

2187 Kuppermann, A., and Raff, L. M., Determination of electronic energy levels of molecules by low-energy electron impact spectroscopy, J. Chem. Phys. **37,** 2497 (1962).

2188 Grimley, R. T., Burns, R. P., and Inghram, M. G., Thermodynamics of the vaporization of nickel oxide, J. Chem. Phys. **35,** 551 (1961).

2189 Thrush, B. A., and Zwolenik, J. J., Spectrum of the tropyl radical, Discussions Faraday Soc. **35,** 196 (1963).

2191 Fineman, M. A., and Petrocelli, A. W., Molecular studies with a Lozier electron impact apparatus, Planetary Space Sci. **3,** 187 (1961).

2192 James, L. H., and Carter, G., A mass spectrometric study of ionization and dissociation by electron impact of perfluoro-methyl cyclohexane, J. Electron. Control **13,** 213 (1962).

2194 Cantone, B., Grasso, F., Foffani, A., and Pignataro, S., Calculation of ionization potentials for aromatic compounds, Z. Physik. Chem. (Frankfurt) **42,** 236 (1964).

2195 Ryabchikov, L. N., and Tikhinskii, G. F., Mass spectrometer study of the sublimation of beryllium chloride, Fiz. Metal. i Metalloved. **10,** 635 (1960).

2196 Kanomata, I., Mass-spectrometric study on ionization and dissociation of diethyl ether by electron impact, Bull. Chem. Soc. Japan **34,** 1596 (1961).

2199 Eriksson, K. B. S., and Isberg, H. B. S., The spectrum of atomic aluminum, Al I, Arkiv Fysik **23,** 527 (1963).

2200 Schonheit, E., Massenspektrometrische Untersuchung der Photoionisation von Argon, Z. Naturforsch. **16a,** 1094 (1961).

6. Author Index for Tables 1 and 2

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7. Appendix 1. Heats of Formation Used in Tables 1 and 2

This appendix contains the auxiliary heats of formation used in calculating the heats of formation presented in tables 1 and 2. It is not intended to be a critical compilation. Many values are only estimates and no attempt has been made to insure internal consistency.

Appendix 1. Heats of Formation Used in Tables 1 and 2

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
H	H	52.095	7007
H^-	H^-	33.39	7007
D	D	52.981	7007
HD	HD	.076	7007
Li	Li	38.41	7004
Li_2	Li_2	50.4	7004
LiH	LiH	32.1	7004
Be	Be	78.0	7140
B	B	134.5	7007
B_2	B_2	198.5	7007
BH	BH	107.46	7007
BH_2	BH_2	48	7004
BH_3	BH_3	24	7007
B_2H_6	B_2H_6	8.5	7007
B_4H_{10}	B_4H_{10}	15.8	7007
B_5H_9	B_5H_9	17.5	7007
B_5H_{11}	B_5H_{11}	24.7	7007
B_6H_{10}	B_6H_{10}	22.6	7007
$B_{10}H_{14}$	$B_{10}H_{14}$	7.54	7007
C	C	171.291	7007
C^-	C^-	140.5	7004
C_2	C_2	199	7004
C_3	C_3	189.7	7004
C_4	C_4	242.3	7004
C_5	C_5	242.4	7004
CH	CH	142.4	7007
CH_2	CH_2	93.7	7007
CH_3	CH_3	33.2	7007
CH_4	CH_4	−17.88	7007
C_2H	C_2H	112	[a] 7036
C_2H_2	C_2H_2	54.19	7007
C_2H_3	C_2H_3	65	7039
C_2H_4	C_2H_4	12.49	7007
C_2H_5	C_2H_5	25	7007
C_2H_6	C_2H_6	−20.24	7007
C_3H_3	$CH_2C{\equiv}CH$	75	[a] 7136
C_3H_4	$CH_2{=}C{=}CH_2$	45.9	7045
C_3H_4	cyclopropene	66.6	7055
C_3H_4	$CH_3C{\equiv}CH$	44.319	7045
C_3H_5	$CH_3C{=}CH_2$	58	[b] 7057
C_3H_5	$CH_2CH{=}CH_2$	30	7048
C_3H_5	cyclopropyl radical	68	[a] 7031
C_3H_6	$CH_3CH{=}CH_2$	4.88	7045
C_3H_6	cyclopropane	12.74	7058
C_3H_7	*n*-C_3H_7	22.1	7084
C_3H_7	*iso*-C_3H_7	16.8	7130
C_3H_8	C_3H_8	−24.82	7045

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_4H_2	$CH{\equiv}CC{\equiv}CH$	102	[g] 7036
C_4H_4	$CH_2{=}CHC{\equiv}CH$	69	[h]
C_4H_5	$CH_3CHC{\equiv}CH$	67	[h]
C_4H_6	$CH_2{=}CHCH{=}CH_2$	26.33	7045
C_4H_6	$C_2H_5C{\equiv}CH$	39.48	7045
C_4H_6	$CH_3C{\equiv}CCH_3$	34.97	7045
C_4H_6	$CH_3CH{=}C{=}CH_2$	38.77	7045
C_4H_7	$CH_3CH{=}CHCH_2$	26	[a] 7075
C_4H_7	$CH_2{=}CHCHCH_3$	20	[h]
C_4H_7	$CH_2{=}C(CH_3)CH_2$	21	[a] 7075
C_4H_8	*cis*-2-C_4H_8	−1.67	7045
C_4H_8	*trans*-2-C_4H_8	−2.67	7045
C_4H_8	methylcyclopropane	6.4	[i]
C_4H_8	1-C_4H_8	−.03	7045
C_4H_8	cyclobutane	6.3	7077
C_4H_8	*iso*-C_4H_8	−4.04	7045
C_4H_9	*n*-C_4H_9	18.5	7084
C_4H_9	*sec*-C_4H_9	8.83	[h]
C_4H_9	*iso*-C_4H_9	12.67	[h]
C_4H_9	*tert*-C_4H_9	4.5	7084
C_4H_{10}	*n*-C_4H_{10}	−30.15	7045
C_4H_{10}	*iso*-C_4H_{10}	−32.15	7045
C_5H_6	cyclopentadiene	31.84	7112
C_5H_8	cyclopentene	7.87	7045
C_5H_8	$CH_2{=}C{=}C(CH_3)_2$	31.0	7045
C_5H_8	$CH_2{=}CHC(CH_3){=}CH_2$	18.1	7045
C_5H_8	$C_2H_5CH{=}C{=}CH_2$	34.80	7045
C_5H_8	$CH_2{=}CHCH_2CH{=}CH_2$	25.1	[h]
C_5H_8	*cis*-$CH_3CH{=}CHCH{=}CH_2$	18.7	7045
C_5H_8	*trans*-$CH_3CH{=}CHCH{=}CH_2$	18.6	7045
C_5H_8	$CH_3CH{=}C{=}CHCH_3$	33.10	7045
C_5H_9	$(CH_3)_2C{=}CHCH_2$	15	[h]
C_5H_9	$CH_3CH{=}CHCHCH_3$	13	[h]
C_5H_{10}	cyclopentane	−18.46	7045
C_5H_{10}	$(CH_3)_2C{=}CHCH_3$	−10.7	7045
C_5H_{10}	1-C_5H_{10}	−5.00	7045
C_5H_{10}	*cis*-2-C_5H_{10}	−6.71	7045
C_5H_{10}	*trans*-2-C_5H_{10}	−7.59	7045
C_5H_{10}	$C_2H_5C(CH_3){=}CH_2$	−8.68	7045
C_5H_{10}	$(CH_3)_2CHCH{=}CH_2$	−6.92	7045
C_5H_{10}	1,2-dimethylcyclopropane	0	[i]
C_5H_{11}	$(C_2H_5)_2CH$	3.9	[h]
C_5H_{11}	*n*-$C_3H_7CHCH_3$	5.9	[h]
C_5H_{11}	*iso*-$C_3H_7CHCH_3$	2.6	[h]
C_5H_{11}	*n*-C_5H_{11}	9.1	[h]
C_5H_{11}	$C_2H_5CH(CH_3)CH_2$	7.7	[h]
C_5H_{11}	*neo*-C_5H_{11}	4	7096
C_5H_{11}	*tert*-C_5H_{11}	1.0	7096
C_5H_{11}	*iso*-C_5H_{11}	7.7	[h]
C_5H_{12}	*n*-C_5H_{12}	−35.00	7045
C_5H_{12}	*iso*-C_5H_{12}	−36.92	7045
C_5H_{12}	*neo*-C_5H_{12}	−39.67	7045
C_6H_4	benzyne	164	[a] 7186
C_6H_5	phenyl radical	72	7263
C_6H_6	$CH{\equiv}CCH{=}CHCH{=}CH_2$	88.4	[h]
C_6H_6	$CH_3C{\equiv}CC{\equiv}CCH_3$	89.2	[h]
C_6H_6	benzene	19.8	7045

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_6H_6	$CH{\equiv}CCH_2CH_2C{\equiv}CH$	98.9	[h]
C_6H_6	$C_2H_5C{\equiv}CC{\equiv}CH$	94.12	[h]
C_6H_6	$CH_3C{\equiv}CCH_2C{\equiv}CH$	94	[h]
C_6H_8	$CH_2{=}CHCH{=}CHCH{=}CH_2$	49	[h]
C_6H_8	1-methylcyclopentadiene	24	[h]
C_6H_8	2-methylcyclopentadiene	24	[h]
C_6H_{10}	cyclohexene	−2	[h]
C_6H_{12}	1-C_6H_{12}	−9.96	7045
C_6H_{12}	cyclohexane	−29.43	7045
C_6H_{12}	methylcyclopentane	−25.5	7045
C_6H_{12}	$CH_2{=}CHC(CH_3)_3$	−14.25	7045
C_6H_{12}	$(CH_3)_2C{=}C(CH_3)_2$	−15.91	7045
C_6H_{13}	*n*-C_6H_{13}	4.2	[h]
C_6H_{14}	$(CH_3)_2CHCH(CH_3)_2$	−42.49	7045
C_6H_{14}	$(C_2H_5)_2CHCH_3$	−41.02	7045
C_6H_{14}	$C_2H_5C(CH_3)_3$	−44.35	7045
C_6H_{14}	*n*-C_6H_{14}	−39.96	7045
C_6H_{14}	*iso*-C_6H_{14}	−41.66	7045
C_7H_7	benzyl radical	37.5	7107
C_7H_7	cycloheptatrienyl radical	65	7112
C_7H_8	spiroheptadiene	52.0	[g] 7108
C_7H_8	cycloheptatriene	43.47	7109
C_7H_8	toluene	11.95	7045
C_7H_8	bicyclo(3.2.0)heptadiene-2,6	62.3	[a] 7110
C_7H_8	bicyclo(2.2.1)heptadiene-2,5	66.8	7226
C_7H_{10}	1,3-cycloheptadiene	22.1	7110
C_7H_{10}	bicyclo(3.2.0)heptene-6	30	[a] 7110
C_7H_{10}	1,2-dimethylcyclopentadiene	17.2	[h]
C_7H_{10}	2,3-dimethylcyclopentadiene	17.2	[h]
C_7H_{10}	5,5-dimethylcyclopentadiene	16.6	[h]
C_7H_{10}	norbornene	31	[a] 7227
C_7H_{12}	4-methylcyclohexene	−7.5	[h]
C_7H_{14}	methylcyclohexane	−36.99	7045
C_7H_{14}	cycloheptane	−28.52	7109
C_7H_{15}	$(C_3H_7)_2CH$	−44.1	[i]
C_7H_{16}	*n*-C_7H_{16}	−44.89	7045
C_8H_6	phenylacetylene	76	[h]
C_8H_8	cubane	148.7	7111
C_8H_8	cyclooctatetraene	71	[h]
C_8H_8	styrene	37	[h]
C_8H_9	*m*-methylbenzyl radical	29.6	[i]
C_8H_9	*p*-methylbenzyl radical	29.6	[i]
C_8H_{10}	2-methylspiroheptadiene	44.1	[g] 7108
C_8H_{10}	6-methylspiroheptadiene	45.4	[g] 7108
C_8H_{10}	*o*-xylene	4.54	7045
C_8H_{10}	*m*-xylene	4.12	7045
C_8H_{10}	*p*-xylene	4.29	7045
C_8H_{10}	$CH_2{=}C(CH_3)C{\equiv}CC(CH_3){=}CH_2$	68.2	[g] 7108
C_8H_{10}	1-methylspiroheptadiene	44.1	[g] 7108
C_8H_{10}	7-methylcycloheptatriene	37.19	[g] 7112
C_8H_{10}	ethylbenzene	7.120	7045
C_8H_{12}	4-vinylcyclohexene	17.6	[h]
C_8H_{12}	1,2,3-trimethylcyclopentadiene	10.3	[h]
C_8H_{12}	1,5,5-trimethylcyclopentadiene	8.9	[h]
C_8H_{16}	*trans*-1,2-dimethylcyclohexane	−43.02	7045

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_8H_{16}	*cis*-1,2-dimethylcyclohexane	−41.15	7045
C_8H_{16}	cyclooctane	−30.06	7109
C_8H_{17}	*n*-C_8H_{17}	−5.7	[h]
C_8H_{18}	*iso*-$C_4H_9C(CH_3)_3$	−53.57	7045
C_8H_{18}	*n*-C_8H_{18}	−49.82	7045
C_9H_7	γ-phenylpropargyl radical	92	[h]
C_9H_8	methylphenylacetylene	65.9	[h]
C_9H_8	indene	42.8	[h]
C_9H_{10}	α-methylstyrene	27.00	7045
C_9H_{12}	1,2,4-trimethylbenzene	−3.33	7045
C_9H_{12}	*p*-ethyltoluene	−.8	[h]
C_9H_{12}	isopropylbenzene	.940	7045
C_9H_{12}	1,2,3-trimethylbenzene	−2.29	7045
C_9H_{12}	*n*-propylbenzene	1.870	7045
C_9H_{12}	1,3,5-trimethylbenzene	−3.84	7045
C_9H_{14}	1,2,3,4-tetramethylcyclopentadiene	1.3	[h]
C_9H_{14}	1,4,5,5-tetramethylcyclopentadiene	1.3	[h]
C_9H_{16}	hexahydroindane	−34	[h]
C_9H_{19}	*n*-C_9H_{19}	−10.6	[h]
C_9H_{20}	*n*-C_9H_{20}	−54.74	7045
$C_{10}H_8$	naphthalene	33.0	[c] 7113, 7114
$C_{10}H_8$	azulene	72.5	7187, 7188
$C_{10}H_{13}$	*p*-isopropylbenzyl radical	17	[i]
$C_{10}H_{14}$	1,2,4,5-tetramethylbenzene	−10.95	[i]
$C_{10}H_{14}$	3,5-dimethylethylbenzene	−8.77	[i]
$C_{10}H_{14}$	1,2,3,5-tetramethylbenzene	−10.33	[i]
$C_{10}H_{14}$	2,5-dimethylethylbenzene	−7.33	[i]
$C_{10}H_{14}$	*tert*-butylbenzene	−7	[h]
$C_{10}H_{14}$	*sec*-butylbenzene	−4.2	[h]
$C_{10}H_{14}$	*n*-butylbenzene	−3.3	7045
$C_{10}H_{14}$	3,4-dimethylethylbenzene	−8.01	[i]
$C_{10}H_{16}$	1,2,4,5,5-pentamethyl-cyclopentadiene	−6.3	[h]
$C_{10}H_{16}$	1,2,3,5,5-pentamethyl-cyclopentadiene	−6.3	[h]
$C_{10}H_{18}$	*trans*-decaline	−43.54	7154
$C_{10}H_{18}$	*cis*-decaline	−40.45	7154
$C_{10}H_{22}$	*n*-$C_{10}H_{22}$	−59.67	7045
$C_{11}H_{10}$	2-methylnaphthalene	25.4	[i]
$C_{11}H_{10}$	1-methylnaphthalene	25.4	[i]
$C_{11}H_{16}$	pentamethylbenzene	−27.2	[h]
$C_{11}H_{18}$	hexamethylcyclopentadiene	−13.9	[h]
$C_{11}H_{23}$	*n*-$C_{11}H_{23}$	−20.5	[h]
$C_{11}H_{24}$	*n*-$C_{11}H_{24}$	−64.6	7045
$C_{12}H_{10}$	biphenyl	39.5	[c] 7059, 7106
$C_{12}H_{12}$	1,2-dimethylnaphthalene	17.8	[i]
$C_{12}H_{18}$	hexamethylbenzene	−29	[h]
$C_{12}H_{26}$	*n*-$C_{12}H_{26}$	−69.52	7045
$C_{13}H_{10}$	fluorene	43.8	[h]
$C_{13}H_{11}$	diphenylmethyl radical	48	[h]
$C_{13}H_{27}$	*n*-$C_{13}H_{27}$	−30.4	[h]
$C_{13}H_{28}$	*n*-$C_{13}H_{28}$	−74.45	7045
$C_{14}H_{10}$	diphenylacetylene	99	[h]
$C_{14}H_{10}$	anthracene	53.8	[c] 7114, 7115
$C_{14}H_{10}$	phenanthrene	47.7	[c] 7114, 7115
$C_{14}H_{14}$	dibenzyl	27.8	7116

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$C_{14}H_{30}$	n-$C_{14}H_{30}$	−79.38	7045
$C_{15}H_{31}$	n-$C_{15}H_{31}$	−40.2	[h]
$C_{15}H_{32}$	n-$C_{15}H_{32}$	−84.31	7045
$C_{16}H_{33}$	n-$C_{16}H_{33}$	−45	[h]
$C_{16}H_{34}$	n-$C_{16}H_{34}$	−89.23	7045
$C_{17}H_{36}$	n-$C_{17}H_{36}$	−94.15	7045
$C_{18}H_{12}$	1,2-benzophenanthrene	66.3	[c, d] 7059
$C_{18}H_{30}$	3-phenyldodecane	−43.7	[h]
$C_{18}H_{30}$	1-phenyldodecane	−43.7	[h]
$C_{18}H_{38}$	n-$C_{18}H_{38}$	−99.04	[h]
$C_{19}H_{32}$	7-phenyltridecane	−48.6	[h]
$C_{19}H_{38}$	1-$C_{19}H_{38}$	−74.01	[h]
$C_{26}H_{46}$	1-phenyleicosane	−81.79	[h]
$C_{26}H_{46}$	2-phenyleicosane	−83.14	[h]
$C_{26}H_{46}$	3-phenyleicosane	−83.14	[h]
$C_{26}H_{46}$	4-phenyleicosane	−83.14	[h]
$C_{26}H_{46}$	5-phenyleicosane	−83.14	[h]
$C_{26}H_{46}$	7-phenyleicosane	−83.14	[h]
$C_{26}H_{46}$	9-phenyleicosane	−83.14	[h]
CB	CB	199	[d] 7007
CB_2	CB_2	183	[d] 7007
C_2B	C_2B	183	[d] 7007
C_2H_5B	C_2H_5B	−41.4	[i]
C_3H_9B	$(CH_3)_3B$	−29.7	7007
$C_6H_{15}B$	$(C_2H_5)_3B$	−37.69	7007
N	N	112.97[f]	7007
N	N(^{2}D)	167.9	7007, 7241
N	N(^{2}P)	195.4	7007, 7241
NH	NH	79	7007
NH_2	NH_2	41	7007
NH_3	NH_3	−11.02	7007
N_2H_2	N_2H_2	48.7	[a] 7167
N_2H_3	N_2H_3	87	[a] 7071
N_2H_4	N_2H_4	22.80	7007
N_3H	HN_3	70.3	7007
CN	CN	100	7138
C_2N	C_2N	123	[a] 7030
C_3N	C_3N	131	[a] 7030
C_4N	C_4N	166	[a] 7030
C_5N	C_5N	216	[a] 7030
C_6N	C_6N	233	[a] 7030
C_2N_2	C_2N_2	73.84	7007
C_4N_2	CNC≡CCN	128	7030
C_6N_2	CNC≡CC≡CCN	183	[g] 7030
CHN	HCN	32.3	7007
CH_4N	CH_2NH_2	36.8	[h]
CH_4N	CH_3NH	37	7132
CH_5N	CH_3NH_2	−5.49	7007
C_2H_3N	CH_3NC	35.6	7007
C_2H_3N	CH_3CN	20.9	7007
C_2H_5N	ethylenimine	26	7129
C_2H_5N	CH_2=$CHNH_2$	5.5	[h]
C_2H_6N	$(CH_3)_2N$	34	7132
C_2H_6N	C_2H_5NH	33	7132
C_2H_7N	$(CH_3)_2NH$	−4.41	7007
C_2H_7N	$C_2H_5NH_2$	−11.27	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_3HN	CH≡CCN	91	[g] 7030
C_3H_3N	CH_2=CHCN	44.5	[h]
C_3H_5N	C_2H_5NC	31	[i]
C_3H_5N	C_2H_5CN	15.9	[i]
C_3H_7N	azetidine	15.5	[g] 7060
C_3H_9N	$(CH_3)_3N$	−5.81	7007
C_3H_9N	*iso*-$C_3H_7NH_2$	−18.5	[h]
C_3H_9N	*n*-$C_3H_7NH_2$	−17.3	[c] 7059
C_4H_5N	cyclopropyl cyanide	43	[g] 7031
C_4H_5N	CH_2=$CHCH_2CN$	41.4	[h]
C_4H_5N	pyrrole	25.88	7240
C_4H_6N	$(CH_3)_2CCN$	28	[h]
C_4H_7N	*n*-C_3H_7NC	26	[i]
C_4H_7N	*n*-C_3H_7CN	10.9	[h]
C_4H_9N	pyrrolidine	−2	7085
$C_4H_{10}N$	$(C_2H_5)_2N$	38	[b] 7139
$C_4H_{11}N$	$(C_2H_5)_2NH$	−21.4	[c] 7059
$C_4H_{11}N$	*tert*-$C_4H_9NH_2$	−26.2	[h]
$C_4H_{11}N$	*iso*-$C_4H_9NH_2$	−23.3	[h]
$C_4H_{11}N$	*sec*-$C_4H_9NH_2$	−24.1	[h]
$C_4H_{11}N$	*n*-$C_4H_9NH_2$	−21.9	[h]
$C_5H_5N_5$	pyridine	33.63	7143
$C_5H_{11}N$	piperidine	−10	[c, d] 7059
C_6H_4N	cyanocyclopentadienyl radical	49.3	[h]
C_6H_7N	aniline	24.8	[h]
C_6H_7N	2-picoline	24.38	7143
C_6H_7N	3-picoline	27.16	7143
C_6H_7N	4-picoline	24.43	7143
$C_6H_{13}N$	cyclohexylamine	−23.4	[h]
$C_6H_{13}N$	hexamethylenimine	−12	[h]
$C_6H_{15}N$	$(n\text{-}C_3H_7)_2NH$	−27.9	[h]
$C_6H_{15}N$	$(iso\text{-}C_3H_7)_2NH$	−30.7	[h]
$C_6H_{15}N$	$(C_2H_5)_3N$	−26	[h]
C_7H_5N	benzonitrile	53.3	[h]
C_7H_8N	aminobenzyl radical	41	[h]
C_7H_9N	*N*-methylaniline	23.9	[h]
C_7H_9N	*m*-toluidine	15.9	[h]
C_7H_9N	*p*-toluidine	15.9	[h]
C_7H_9N	*o*-toluidine	16.9	[h]
C_7H_9N	benzylamine	19.9	[h]
C_7H_9N	2,3-lutidine	14.2	[c, d] 7059
C_7H_9N	2,4-lutidine	14.2	[c, d] 7059
C_7H_9N	2,6-lutidine	13.43	7143
C_8H_6N	cyanobenzyl radical	69	[h]
C_8H_7N	benzyl cyanide	42	[c, d] 7059
C_8H_7N	*m*-tolunitrile	48	[c, d] 7059
C_8H_7N	*p*-tolunitrile	48	[c, d] 7059
$C_8H_{11}N$	*N*,*N*-dimethylaniline	20.96	[h]
$C_8H_{11}N$	*N*-ethylaniline	18.9	[h]
$C_8H_{19}N$	$(n\text{-}C_4H_9)_2NH$	−37.8	[h]
$C_9H_{13}N$	*N*,*N*-dimethyl-*p*-toluidine	13.84	[h]
$C_9H_{13}N$	*N*,*N*-dimethyl-*m*-toluidine	13.84	[h]
$C_9H_{13}N$	*N*-ethyl-*N*-methylaniline	16.03	[h]
$C_9H_{13}N$	*N*-*n*-propylaniline	14.0	[h]
$C_9H_{13}N$	*N*,*N*-dimethyl-*o*-toluidine	15.84	[h]
$C_9H_{21}N$	$(n\text{-}C_3H_7)_3N$	40.7	[h]

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$C_{10}H_{15}N$	*N*,*N*-dimethyl-*p*-ethylaniline	6.91	[h]
$C_{10}H_{15}N$	*N*,*N*,3,5-tetramethylaniline	5.2	[i]
$C_{10}H_{15}N$	*N*,*N*,2,6-tetramethylaniline	6.8	[i]
$C_{10}H_{15}N$	*N*,*N*,2,4-tetramethylaniline	5.8	[i]
$C_{10}H_{15}N$	*N*,*N*-diethylaniline	10.9	[h]
$C_{10}H_{15}N$	*N*-*n*-butylaniline	9.1	[h]
$C_{11}H_{17}N$	*N*,*N*-dimethyl-*p*-isopropylaniline	2.63	[h]
$C_{11}H_{17}N$	*N*,*N*-diethyl-*p*-toluidine	3.98	[h]
$C_{12}H_{11}N$	diphenylamine	56	[h]
$C_{12}H_{19}N$	*N*,*N*-di-*n*-propylaniline	2.86	[h]
$C_{12}H_{19}N$	*N*,*N*-dimethyl-*p*-*tert*-butylaniline	−5.6	[h]
$C_{14}H_{23}N$	*N*,*N*-di-*n*-butylaniline	−7.0	[h]
$C_{18}H_{15}N$	triphenylamine	84.8	[h]
CH_2N_2	diazomethane	49.3	[a] 7183
CH_2N_2	diazirine	79.3	[a] 7183
CH_6N_2	$CH_3N_2H_3$	22.55	7007
$C_2H_6N_2$	$CH_3N{=}NCH_3$	43	7215
$C_2H_8N_2$	1,1-dimethylhydrazine	19.7	7029
$C_2H_8N_2$	1,2-dimethylhydrazine	21.6	7029
$C_3H_{10}N_2$	$(CH_3)_3N_2H$	19.2	[g] 7071
$C_4H_4N_2$	metadiazine	46.99	7141
$C_4H_4N_2$	paradiazine	46.86	7141
$C_4H_4N_2$	orthodiazine	66.53	7141
$C_4H_{10}N_2$	$C_2H_5N{=}NC_2H_5$	33	7223
$C_4H_{12}N_2$	$(CH_3)_4N_2$	16.6	[g] 7071
$C_4H_{12}N_2$	1,1-diethylhydrazine	9	[b] 7142
$C_5H_6N_2$	4-aminopyridine	37.4	[i]
$C_5H_{14}N_2$	1-methyl-1-*n*-butylhydrazine	4	[b] 7142
$C_6H_8N_2$	benzenediamine	30.0	[h]
$C_6H_8N_2$	phenylhydrazine	57.0	[i]
$C_6H_{14}N_2$	(*iso*-$C_3H_7)_2N_2$	19.4	7102
$C_{10}H_{16}N_2$	*p*-*bis*(dimethylamino)benzene	20.9	[h]
CH_3N_3	CH_3N_3	57	[c, g] 7024
O	O	59.553	7007
O	O(^{1}D)	104.9	7007, 7241
O	O(^{1}S)	156.17	7007, 7241
O^-	O^-	24.29	7007
O_3	O_3	34.1	7007
HO	OH	9.31	7007
HO^-	OH^-	−33.67	7007
H_2O	H_2O	−57.796	7007
D_2O	D_2O	−59.560	7007
HO_2	HO_2	5	7166
H_2O_2	H_2O_2	−32.58	7007
LiO	LiO	20.1	7004
Li_2O	Li_2O	−39.9	7004
BeO	BeO	31	7004
Be_2O	Be_2O	−18	7140
Be_2O_2	Be_2O_2	−102	7140
Be_3O_3	Be_3O_3	−260	7140
CO	CO	−26.416	7007
CO_2	CO_2	−94.051	7007
C_3O_2	C_3O_2	−8.3	7004
NO	NO	21.57	7007
N_2O	N_2O	19.61	7007
NO_2	NO_2	7.93	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$B_3H_3O_3$	$B_3H_3O_3$	−289	7007
CHO	CHO	−4.12	7007
CH_2O	CH_2O	−28	7007
CH_3O	CH_3O	−.5	7184
CH_4O	CH_3OH	−47.96	7007
C_2H_2O	CH_2CO	−14.6	7007
C_2H_3O	CH_3CO	−4.5	7007
C_2H_4O	CH_3CHO	−39.72	7007
C_2H_4O	ethylene oxide	−12.58	7007
C_2H_5O	C_2H_5O	−8.5	7048
C_2H_6O	CH_3OCH_3	−43.99	7007
C_2H_6O	C_2H_5OH	−56.19	7007
C_3H_4O	CH_2=CHCHO	−23	[d] 7018
C_3H_5O	CH_3COCH_2	−7.7	([h])
C_3H_6O	propylene oxide	−22	7061
C_3H_6O	CH_2=$CHCH_2OH$	−32.3	[d] 7018
C_3H_6O	C_2H_5CHO	−48.7	7018
C_3H_6O	CH_2=$CHOCH_3$	−27.7	7018
C_3H_6O	CH_3COCH_3	−51.8	([h])
C_3H_6O	trimethylene oxide	−24	[g] 7060
C_3H_8O	*n*-C_3H_7OH	−62.3	7018
C_3H_8O	*iso*-C_3H_7OH	−65.6	7018
C_3H_8O	$CH_3OC_2H_5$	−52.1	[c] 7059
C_4H_4O	furan	−8.29	7073
C_4H_4O	CH_3COC≡CH	11	([h])
C_4H_6O	3,4-epoxy-1-butene	10	[g] 7014
C_4H_6O	CH_3CH=$CHCHO$	−30.0	[d] 7018
C_4H_6O	CH_3COCH=CH_2	−26.72	([h])
C_4H_8O	tetrahydrofuran	−43.08	7079
C_4H_8O	*iso*-C_3H_7CHO	−55.33	([h])
C_4H_8O	$C_2H_5COCH_3$	−58.37	7258
C_4H_8O	*n*-C_3H_7CHO	−53.7	([h])
$C_4H_{10}O$	*n*-C_4H_9OH	−66.5	[e] 7046, 7086
$C_4H_{10}O$	*n*-$C_3H_7OCH_3$	−60	([i])
$C_4H_{10}O$	*sec*-C_4H_9OH	−71.2	([h])
$C_4H_{10}O$	$C_2H_5OC_2H_5$	−60.26	7007
C_5H_6O	1-methylfuran	−16	([i])
C_5H_6O	2-methylfuran	−16	([i])
C_5H_8O	cyclopentanone	−46.31	7259
C_5H_8O	dihydropyran	−28.5	7079
$C_5H_{10}O$	*n*-$C_3H_7COCH_3$	−61.7	([h])
$C_5H_{10}O$	$C_2H_5COC_2H_5$	−61.7	([h])
$C_5H_{10}O$	tetrahydropyran	−52	([h])
$C_5H_{10}O$	*iso*-C_4H_9CHO	−60.2	([h])
$C_5H_{10}O$	*n*-C_4H_9CHO	−58.8	([h])
$C_5H_{10}O$	*iso*-$C_3H_7COCH_3$	−63.0	([h])
$C_5H_{12}O$	*n*-$C_3H_7CH(OH)CH_3$	−76.1	([h])
$C_5H_{12}O$	*iso*-$C_3H_7CH(OH)CH_3$	−77.4	([h])
C_6H_5O	phenoxy radical	9	[a] 7186
C_6H_6O	phenol	−23.05	7100
C_6H_8O	dimethylfuran	−23.5	([h])
C_6H_9O	$(CH_3)_2C$=$CHCOCH_2$	2.35	([h])
$C_6H_{10}O$	cyclohexanone	−54.09	7259
$C_6H_{10}O$	$(CH_3)_2C$=$CHCOCH_3$	−41.8	([h])
$C_6H_{12}O$	*tert*-$C_4H_9COCH_3$	−71.3	([h])
$C_6H_{12}O$	*sec*-$C_4H_9COCH_3$	−67.98	([h])

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$C_6H_{12}O$	*n*-$C_4H_9COCH_3$	−66.6	[h]
$C_6H_{12}O$	*iso*-$C_4H_9COCH_3$	−67.98	[h]
$C_6H_{14}O$	(*iso*-$C_3H_7)_2O$	−69.9	[h]
$C_6H_{14}O$	(*n*-$C_3H_7)_2O$	−67.2	[h]
C_7H_6O	benzaldehyde	−10.5	[c] 7059, 7106
C_7H_6O	tropone	17	[h]
C_7H_8O	benzyl alcohol	−25	[c, d] 7059
C_7H_8O	anisole	−16	[h]
C_7H_8O	*m*-cresol	−31.63	7100
C_7H_8O	*p*-cresol	−29.97	7100
C_7H_8O	*o*-cresol	−30.74	7100
$C_7H_{14}O$	*n*-$C_5H_{11}COCH_3$	−72	[h]
C_8H_8O	acetophenone	−23	[d] 7186
C_8H_8O	*p*-methylbenzaldehyde	−21	[h]
C_8H_9O	methoxybenzyl radical	3	[i]
$C_8H_{10}O$	phenyl ethyl ether	−20.3	[h]
$C_8H_{10}O$	*m*-methylanisole	−23	[h]
$C_8H_{10}O$	7-methoxycycloheptatriene	5	7229
$C_8H_{10}O$	benzyl methyl ether	−20	[h]
$C_8H_{10}O$	*p*-methylanisole	−23	[h]
$C_9H_{10}O$	phenyl ethyl ketone	−24.7	[h]
$C_9H_{10}O$	benzyl methyl ketone	−24.7	[h]
$C_9H_{10}O$	methylacetophenone	−28.8	[h]
$C_9H_{12}O$	*p*-ethylanisole	−28	[h]
$C_9H_{12}O$	ethoxytoluene	−28	[h]
$C_{12}H_{10}O$	phenyl ether	17	[g] 7186
$C_{13}H_{10}O$	benzophenone	12.5	7189
$C_{14}H_{12}O$	*p*-methylbenzophenone	3.3	[h]
CHO_2	COOH	−39.2	7018
CH_2O_2	HCOOH	−90.48	7007
$C_2H_2O_2$	CHOCHO	−74	[d] 7001
$C_2H_4O_2$	CH_3COOH	−103.31	7007
$C_2H_4O_2$	$HCOOCH_3$	−83.7	7007
$C_3H_4O_2$	CH_3COCHO	−66	7056
$C_3H_6O_2$	$HCOOC_2H_5$	−89	[i]
$C_3H_6O_2$	CH_3COOCH_3	−99.2	7048
$C_3H_6O_2$	C_2H_5COOH	−108.7	[i]
$C_3H_8O_2$	$(CH_3O)_2CH_2$	−85.3	[d] 7018
$C_4H_6O_2$	$CH_2{=}CHCH_2COOH$	−84.5	[h]
$C_4H_6O_2$	$CH_3COOCH{=}CH_2$	−74.9	[h]
$C_4H_6O_2$	$CH_3COCOCH_3$	−78.1	7074
$C_4H_8O_2$	*n*-C_3H_7COOH	−113.5	[d] 7018
$C_4H_8O_2$	$CH_3COOC_2H_5$	−106.58	7048
$C_4H_8O_2$	*iso*-C_3H_7COOH	−118.5	[d] 7018
$C_4H_8O_2$	*p*-dioxane	−85	[d] 7046
$C_4H_8O_2$	$C_2H_5COOCH_3$	−106.6	[i]
$C_4H_8O_2$	$HCOOCH(CH_3)_2$	−97	7080
$C_4H_8O_2$	1,2-epoxy-3-methoxypropane	−43	[g] 7014
$C_4H_8O_2$	$HCOOCH_2CH_2CH_3$	−94	7057
$C_4H_{10}O_2$	$(CH_3O)_2CHCH_3$	−93.1	7091
$C_5H_4O_2$	2-furaldehyde	−25	[i]
$C_5H_8O_2$	$CH_3COCH_2COCH_3$	−83	[i]
$C_5H_8O_2$	$C_2H_5COCOCH_3$	−83	[i]
$C_5H_{10}O_2$	$C_2H_5COOC_2H_5$	−113.5	[c] 7081
$C_5H_{10}O_2$	$CH_3COOCH_2CH_2CH_3$	−112.8	7048
$C_5H_{10}O_2$	*n*-$C_3H_7COOCH_3$	−110.7	[c] 7081

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$C_5H_{10}O_2$	*iso*-$C_3H_7COOCH_3$	−112	[i]
$C_5H_{10}O_2$	$HCOOCH_2CH(CH_3)_2$	−102	[i]
$C_5H_{10}O_2$	$HCOO(CH_2)_3CH_3$	−98.39	[i]
$C_5H_{10}O_2$	$CH_3COOCH(CH_3)_2$	−115.85	7048
$C_5H_{12}O_2$	$(CH_3O)_2C(CH_3)_2$	−94.1	[h]
$C_5H_{12}O_2$	$(C_2H_5O)_2CH_2$	−89.4	[h]
$C_6H_4O_2$	*p*-benzoquinone	−24.6	[c, d] 7059
$C_6H_6O_2$	*p*-dihydroxybenzene	−70.8	[h]
$C_6H_{12}O_2$	$C_2H_5COOCH(CH_3)_2$	−116	[h]
$C_6H_{12}O_2$	$CH_3COO(CH_2)_3CH_3$	−118.9	7048
$C_6H_{12}O_2$	$CH_3COOCH_2CH(CH_3)_2$	−121.1	7048
$C_6H_{12}O_2$	$CH_3COOCH(CH_3)C_2H_5$	−121	[i]
$C_7H_6O_2$	*p*-hydroxybenzaldehyde	−57.8	[h]
$C_7H_6O_2$	benzoic acid	−72.6	[h]
$C_7H_8O_2$	methoxyphenol	−61.2	[h]
$C_8H_8O_2$	α-hydroxyacetophenone	−56.4	[h]
$C_8H_8O_2$	*m*-hydroxyacetophenone	−65.6	[h]
$C_8H_8O_2$	*p*-hydroxyacetophenone	−65.6	[h]
$C_8H_8O_2$	*p*-methoxybenzaldehyde	−48.1	[h]
$C_8H_8O_2$	methyl benzoate	−71.7	7048
$C_9H_{10}O_2$	methyl *p*-toluate	−76	[h]
$C_9H_{10}O_2$	α-methoxyacetophenone	−56	[h]
$C_9H_{10}O_2$	*m*-methoxyacetophenone	−57	[h]
$C_9H_{10}O_2$	*p*-methoxyacetophenone	−57	[h]
$C_{13}H_{10}O_2$	phenyl benzoate	−30	[d] 7186
$C_{13}H_{10}O_2$	*p*-hydroxybenzophenone	−33.5	[h]
$C_{14}H_{10}O_2$	benzil	−21.8	7189
$C_{14}H_{12}O_2$	methoxybenzophenone	−23.9	[h]
$C_4H_8O_3$	$CH_3OCH_2COOCH_3$	−132	[h]
$C_4H_{10}O_3$	$(CH_3O)_3CH$	−121.3	[c] 7059
$C_5H_{12}O_3$	$(CH_3O)_3CCH_3$	−128	[i]
$C_8H_8O_3$	methyl *p*-hydroxybenzoate	−113.8	[h]
$C_9H_{10}O_3$	methyl *p*-methoxybenzoate	−104	[h]
$C_{13}H_{10}O_3$	diphenyl carbonate	−86	[d] 7186
$C_5H_{12}O_4$	$(CH_3O)_4C$	−158	[i]
$C_7H_{14}O_6$	methylglucoside	−270	[c, d] 7059
HNO_3	HNO_3	−32.28	7007
$C_2H_7BO_2$	$(CH_3O)_2BH$	−139.2	7217
$C_3H_9BO_3$	$(CH_3O)_3B$	−215.0	7007
CH_3NO	$HCONH_2$	−46	[d] 7007
C_2H_5NO	CH_3CONH_2	−54	[c, d] 7059
C_3H_7NO	$CH_3CONHCH_3$	−55	[i]
C_3H_7NO	$HCON(CH_3)_2$	−50	[i]
C_4H_9NO	$CH_3CON(CH_3)_2$	−58	[i]
C_5H_5NO	4-hydroxypyridine	−15	[h]
$C_5H_{11}NO$	$HCON(C_2H_5)_2$	−60	[i]
C_6H_5NO	2-pyridinecarboxaldehyde	2	[h]
C_6H_5NO	4-pyridinecarboxaldehyde	2	[h]
C_6H_7NO	aminophenol	−21.1	[h]
$C_6H_{13}NO$	$CH_3CON(C_2H_5)_2$	−68	[i]
C_7H_5NO	phenyl isocyanate	20.2	[h]
C_7H_5NO	cyanophenol	5.6	[h]
C_7H_7NO	benzamide	−22	[i]
C_7H_7NO	*p*-aminobenzaldehyde	−8.1	[h]
C_7H_9NO	*p*-methoxyaniline	−11.5	[h]
C_8H_5NO	*p*-cyanobenzaldehyde	18.6	[h]

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_8H_9NO	aminoacetophenone	−15.9	[h]
C_8H_9NO	acetanilide	−23	[i]
C_9H_7NO	*p*-cyanoacetophenone	10.8	[h]
C_9H_7NO	α-cyanoacetophenone	14.9	[h]
$C_{13}H_{11}NO$	aminobenzophenone	16.2	[h]
$C_{14}H_9NO$	cyanobenzophenone	42.9	[h]
$C_2H_6N_2O$	$(CH_3)_2NNO$	14.5	[c, d] 7059
CH_3NO_2	CH_3NO_2	−17.86	7007
CH_3NO_2	CH_3ONO	−16.5	7007
$C_2H_5NO_2$	$C_2H_5NO_2$	−23.56	7007
$C_2H_5NO_2$	NH_2CH_2COOH	−96.7	[h]
$C_3H_7NO_2$	*iso*-$C_3H_7NO_2$	−30	[h]
$C_3H_7NO_2$	*n*-C_3H_7ONO	−30.9	[h]
$C_3H_7NO_2$	*n*-$C_3H_7NO_2$	−28.5	[h]
$C_4H_5NO_2$	$CH_2CNCOOCH_3$	−65.4	[h]
$C_4H_9NO_2$	*n*-C_4H_9ONO	−35.8	[h]
$C_6H_5NO_2$	nitrobenzene	15	[h]
$C_6H_{13}NO_2$	isoleucine	−120.3	[h]
$C_7H_6NO_2$	*m*-nitrobenzyl radical	30	[h]
$C_7H_7NO_2$	*m*-nitrotoluene	10	[c, d] 7059
$C_7H_7NO_2$	*p*-nitrotoluene	10	[i]
$C_8H_9NO_2$	methyl *p*-aminobenzoate	−64	[h]
$C_9H_7NO_2$	methyl *p*-cyanobenzoate	−37.4	[h]
$C_2H_6N_2O_2$	$(CH_3)_2NNO_2$	33.7	7134
$C_4H_{10}N_2O_2$	$(C_2H_5)_2NNO_2$	36.8	7134
$C_6H_6N_2O_2$	*o*-nitroaniline	15	[h]
$C_6H_6N_2O_2$	*m*-nitroaniline	15	[h]
$C_6H_6N_2O_2$	*p*-nitroaniline	15	[h]
$C_2H_5NO_3$	$C_2H_5ONO_2$	−36.82	7007
$C_3H_7NO_3$	*n*-$C_3H_7ONO_2$	−42	[i]
$C_6H_5NO_3$	*p*-nitrophenol	−32.4	[h]
$C_7H_5NO_3$	*p*-nitrobenzaldehyde	−19.4	[h]
$C_8H_7NO_3$	*m*-nitroacetophenone	−27.2	[h]
$C_8H_7NO_3$	*p*-nitroacetophenone	−27.2	[h]
$C_{13}H_9NO_3$	*p*-nitrobenzophenone	4.9	[h]
$C_8H_7NO_4$	methyl *p*-nitrobenzoate	−75.4	[h]
F	F	18.88	7007
F^-	F^-	−64.7	7007
HF	HF	−64.8	7007
XeF_2	XeF_2	−25.9	7195
XeF_4	XeF_4	−51.5	7195
XeF_6	XeF_6	−70.4	7195
LiF	LiF	−79.5	7004
Li_2F_2	Li_2F_2	−221.6	7004
BeF	BeF	−41.5	7140
BeF_2	BeF_2	−189.6	7140
BF	BF	−29.2	7007
BF_2	BF_2	−130.6	7004
BF_3	BF_3	−271.75	7007
CF	CF	68	[b]
CF_2	CF_2	−35	7009
CF_3	CF_3	−114	7007
C_2F_3	C_2F_3	−45.8	7034
CF_4	CF_4	−221	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_2F_4	C_2F_4	−155.5	7007
C_2F_5	C_2F_5	−212	7034
C_2F_6	C_2F_6	−310	7007
C_3F_6	C_3F_6	−258.75	7034
C_3F_7	*n*-C_3F_7	−306.5	7034
C_3F_7	*iso*-C_3F_7	−319.9	7034
C_3F_8	C_3F_8	−411	7034
C_4F_8	perfluoromethylcyclohexane	−352.0	7053
C_4F_{10}	*n*-C_4F_{10}	−505.5	7034
C_7F_{14}	perfluoromethylclohexane	−675.3	7228
NF	NF	57	[b]
NF_2	NF_2	10.3	7007
N_2F_2	*trans*-N_2F_2	19.6	7007
N_2F_2	*cis*-N_2F_2	16.6	7007
NF_3	NF_3	−29.8	7007
N_2F_4	N_2F_4	−1.7	7007
OF	OF	41	7007
O_2F	O_2F	3.0	7004
OF_2	OF_2	−5.2	7007
O_2F_2	O_2F_2	4.3	7007
CH_2F	CH_2F	−6.6	[b]
CH_3F	CH_3F	−67	7012
C_2H_2F	C_2H_2F	−12.2	[b]
C_2H_3F	C_2H_3F	−28	7012
C_2H_4F	C_2H_4F	−16	[h]
C_2H_5F	C_2H_5F	−60.05	[h]
C_3H_6F	$CH_2FCH_2CH_2$	−20.9	[h]
C_5H_9F	fluorocyclopentane	−61	[i]
$C_5H_{11}F$	*n*-$C_5H_{11}F$	−74.8	[h]
C_6H_5F	fluorobenzene	−26.48	7097
C_7H_7F	*o*-fluorotoluene	−33	[i]
C_7H_7F	*m*-fluorotoluene	−34	[i]
C_7H_7F	*p*-fluorotoluene	−34.01	7148
CHF_2	CHF_2	−70.2	[b]
CH_2F_2	CH_2F_2	−106.8	7007
$C_2H_2F_2$	$CH_2{=}CF_2$	−78.6	7007
$C_2H_4F_2$	CH_3CHF_2	−114.3	7007
$C_6H_4F_2$	*p*-difluorobenzene	−70.69	7148
$C_6H_4F_2$	*m*-difluorobenzene	−71.35	7148
$C_6H_4F_2$	*o*-difluorobenzene	−67.65	7148
CHF_3	CHF_3	−164.5	7007
C_2HF_3	C_2HF_3	−111.9	[e] 7012, 7037
$C_2H_3F_3$	CH_3CF_3	−176.0	7007
$C_3H_3F_3$	$CH_2{=}CHCF_3$	−154	[a] 7042
$C_3H_5F_3$	$C_2H_5CF_3$	−191	[a] 7042
$C_7H_5F_3$	benzotrifluoride	−138.87	7105
BOF	BOF	−145	7007
$B_3O_3F_3$	$B_3O_3F_3$	−568	7007
CH_3BF_2	CH_3BF_2	−194	[a] 7020
$C_2H_3BF_2$	$CH_2{=}CHBF_2$	−190	[a] 7020
$C_2H_5BF_2$	$C_2H_5BF_2$	−214	[a] 7020
$C_3H_7BF_2$	*iso*-$C_3H_7BF_2$	−219	[a] 7020
$C_8H_{10}NF$	*N*,*N*-dimethyl-*p*-fluoroaniline	−23	[h]
C_2H_3OF	CH_3COF	−104.9	7007

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_6H_5OF	*o*-fluorophenol	−67.9	[h]
C_7H_5OF	benzoyl fluoride	−54.6	[h]
$C_3H_3OF_3$	CH_3COCF_3	−218	[a] 7044
Na	Na	25.755	7004
Na_2	Na_2	32.87	7004
Mg	Mg	35.28	7004
MgO	MgO	1.0	7004
MgF	MgF	−53.1	7004
MgF_2	MgF_2	−173.2	7004
Mg_2F_4	Mg_2F_4	−411.9	7004
Al	Al	78.0	7007
AlO	AlO	21.8	7007
Al_2O	Al_2O	−31	7007
Al_2O_2	Al_2O_2	−94	7007
AlF	AlF	−61.7	7007
AlF_2	AlF_2	−149.2	7207
AlF_3	AlF_3	−287.9	7007
Si	Si	108.9	7007
Si_2	Si_2	142	7007
Si_3	Si_3	147	7007
SiH_3	SiH_3	33.4	[b]
SiH_4	SiH_4	8.2	7007
Si_2H_6	Si_2H_6	19.2	7007
SiB	SiB	175	[d] 7007
SiC	SiC	177	7007
SiC_2	SiC_2	147	7007
Si_2C	Si_2C	132	7007
Si_2C_2	Si_2C_2	168	[d] 7007
Si_2C_3	Si_2C_3	177	[d] 7007
Si_3C	Si_3C	162	[d] 7007
SiO	SiO	−23.8	7007
SiF	SiF	1.7	7007
SiF_4	SiF_4	−385.98	7007
C_2H_6Si	$C_2H_3SiH_3$	−2	7007
C_2H_8Si	$C_2H_5SiH_3$	−32	[i]
$C_3H_{10}Si$	$(CH_3)_3SiH$	−42	[a] 7139
$C_3H_{10}Si$	*iso*-$C_3H_7SiH_3$	−38	[i]
$C_4H_{12}Si$	$(CH_3)_4Si$	−57.149	7007
$C_5H_{14}Si$	$(CH_3)_3SiC_2H_5$	−63	[a] 7139
$C_6H_{16}Si$	*iso*-$C_3H_7Si(CH_3)_3$	−72	[a] 7139
$C_6H_{16}Si$	$(C_2H_5)_3SiH$	−47	[d] 7007
$C_7H_{18}Si$	*tert*-$C_4H_9Si(CH_3)_3$	−83	[a] 7139
$C_8H_{20}Si$	$(n\text{-}C_3H_7)_2Si(CH_3)_2$	−41	[d] 7135
$C_8H_{20}Si$	$(C_2H_5)_4Si$	−61	[d] 7007
$C_{10}H_{16}Si$	benzyltrimethylsilane	−30	[i]
$C_6H_{18}Si_2$	$(CH_3)_3SiSi(CH_3)_3$	−126	[g] 7139
BCSi	BCSi	166	[d] 7007
$C_7H_{19}SiN$	$(CH_3)_3SiN(C_2H_5)_2$	−98	[a] 7139
$C_4H_{12}SiO$	$(CH_3)_3SiOCH_3$	−132	[a] 7139
$C_6H_{18}Si_2O$	$(CH_3)_3SiOSi(CH_3)_3$	−185.88	7007
P	P	75.20	7007
P_2	P_2	34.5	7007
P_4	P_4	14.08	7007
PH	PH	59.2	7004
PH_2	PH_2	30.1	7004

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
PH_3	PH_3	1.3	7007
P_2H_3	P_2H_3	23	[b] 7123
P_2H_4	P_2H_4	5.0	7007
PC	PC	111.7	7004
PO	PO	−1.46	7004
PF_3	PF_3	−219.6	7007
AlP	AlP	103	[c] 7208
CH_5P	CH_3PH_2	−7	[g] 7224
C_2H_7P	$C_2H_5PH_2$	−12	[g] 7224
C_2H_7P	$(CH_3)_2PH$	−15	7028
C_3H_9P	$(CH_3)_3P$	−23.2	7069
$C_4H_{11}P$	$(C_2H_5)_2PH$	−25	[g] 7224
$C_6H_{15}P$	$(C_2H_5)_3P$	−38	[g] 7224
$C_{18}H_{15}P$	triphenylphosphine	72.4	7118
S	S	66.636	7007
S_2	S_2	30.68	7007
S_4	S_4	32.7	7007
S_6	S_6	24.5	7007
S_8	S_8	24.45	7007
HS	HS	34.10	7007
H_2S	H_2S	−4.93	7007
H_2S_2	H_2S_2	2.53	7007
CS	CS	56	7007
CS_2	CS_2	28.05	7007
SO	SO	1.496	7007
SO_2	SO_2	−70.944	7007
SF_4	SF_4	−171.7	7197
SF_6	SF_6	−289	7007
CH_3S	CH_3S	32.3	[h]
CH_4S	CH_3SH	−5.34	7007
C_2H_4S	CH_2=CHSH	20.7	[h]
C_2H_4S	ethylene sulfide	19.69	7007
C_2H_5S	C_2H_5S	25.5	7019
C_2H_6S	CH_3SCH_3	−8.90	7007
C_2H_6S	C_2H_5SH	−10.95	7007
C_3H_6S	propylene sulfide	19.7	[g] 7063
C_3H_6S	trimethylene sulfide	14.78	7062
C_3H_7S	*n*-C_3H_7S	39	[a] 7257
C_3H_8S	$C_2H_5SCH_3$	−14.22	7067
C_3H_8S	*n*-C_3H_7SH	−14.3	[h]
C_4H_4S	thiophene	24.5	[c] 7059
C_4H_8S	tetrahydrothiophene	−8.1	7043
C_4H_8S	CH_3SCH_2CH=CH_2	10	[g] 7083
$C_4H_{10}S$	*iso*-$C_3H_7SCH_3$	−21.43	7087
$C_4H_{10}S$	$C_2H_5SC_2H_5$	−19.86	7007
$C_4H_{10}S$	*sec*-C_4H_9SH	−20.56	[h]
$C_4H_{10}S$	*iso*-C_4H_9SH	−20.56	[h]
$C_4H_{10}S$	*tert*-C_4H_9SH	−23.86	[h]
$C_4H_{10}S$	*n*-C_4H_9SH	−19.2	[h]
$C_4H_{10}S$	*n*-$C_3H_7SCH_3$	−19.51	7087
C_5H_6S	2-methylthiophene	19.94	7225
$C_5H_{10}S$	3-methyltetrahydrothiophene	−8.72	[h]
$C_5H_{10}S$	pentamethylene sulfide	−13.5	[h]
$C_5H_{10}S$	cyclopentanethiol	−9.43	[h]
$C_5H_{12}S$	*n*-$C_5H_{11}SH$	−24.14	[h]

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
$C_5H_{12}S$	$(C_2H_5)_2CHSH$	−25.5	[h]
$C_5H_{12}S$	*n*-$C_4H_9SCH_3$	−23.43	[h]
$C_5H_{12}S$	*n*-$C_3H_7SC_2H_5$	−23.43	[h]
$C_5H_{12}S$	*tert*-$C_4H_9SCH_3$	−28.08	[h]
$C_5H_{12}S$	*iso*-$C_5H_{11}SH$	−25.49	[h]
C_6H_5S	phenyl sulfide radical	51	7019
C_6H_6S	benzenethiol	25.37	7101
C_6H_8S	2-ethylthiophene	12	[i]
$C_6H_{10}S$	cyclopentenyl methyl sulfide	11.85	[i]
$C_6H_{12}S$	cyclohexanethiol	−21.23	[i]
$C_6H_{14}S$	$(n\text{-}C_3H_7)_2S$	−28.3	[h]
C_7H_8S	phenyl methyl sulfide	23.5	7019
$C_7H_{10}S$	2-propylthiophene	7.0	[i]
$C_8H_{10}S$	phenyl ethyl sulfide	18.4	7019
$C_8H_{12}S$	2-butylthiophene	2.1	[i]
$C_8H_{18}S$	$(n\text{-}C_4H_9)_2S$	−38.2	[h]
$C_2H_6S_2$	CH_3SSCH_3	−5.64	7007
$C_4H_8S_2$	thiadioxane	3.5	[h]
$C_4H_{10}S_2$	$C_2H_5SSC_2H_5$	−17.42	7051
$C_2H_6S_3$	CH_3SSSCH_3	0	7026
COS	COS	−33.96	7007
SNF_7	SF_5NF_2	−245	[a] 7196
SO_2F_2	SO_2F_2	−205	[a] 7121
CHNS	HNCS	30.5	7007
C_2H_3NS	CH_3NCS	31.3	7007
C_2H_3NS	CH_3SCN	38.3	7007
C_3H_5NS	C_2H_5NCS	26	[h]
C_3H_5NS	C_2H_5SCN	33	[h]
C_4H_7NS	*n*-C_3H_7NCS	21	[h]
C_7H_5NS	phenyl thiocyanate	70	[h]
C_7H_5NS	phenyl isothiocyanate	63	[h]
C_8H_7NS	benzyl thiocyanate	65	[h]
CH_4N_2S	NH_2CSNH_2	−2	[d] 7001
$C_2H_6N_2S$	$NH_2CSNHCH_3$	−3	[i]
$C_3H_6N_2S$	$NH_2CSNHCH{=}CH_2$	22	[i]
$C_3H_8N_2S$	$CH_3NHCSNHCH_3$	−4	[i]
$C_3H_8N_2S$	$NH_2CSN(CH_3)_2$	−6	[i]
$C_4H_{10}N_2S$	$CH_3NHCSN(CH_3)_2$	−7	[i]
$C_5H_{12}N_2S$	$(CH_3)_2NCSN(CH_3)_2$	−10	[i]
$C_5H_{12}N_2S$	$C_2H_5NHCSNHC_2H_5$	−14	[i]
$C_5H_{11}NSO_2$	methionine	−101	[h]
SO_2NF_3	FSO_2NF_2	−170	[a] 7196
SO_3NF_3	FSO_2ONF_2	−163	[a] 7196
Cl	Cl	29.082	7007
Cl^-	Cl^-	−58.8	7007
HCl	HCl	−22.062	7007
LiCl	LiCl	−46.778	7004
Li_2Cl_2	Li_2Cl_2	−143.06	7004
$BeCl_2$	$BeCl_2$	−85.7	7140
BCl	BCl	35.73	7007
BCl_2	BCl_2	−19.5	[b]
BCl_3	BCl_3	−96.50	7007
B_2Cl_4	B_2Cl_4	−117.2	7007
CCl	CCl	122	[b]
CCl_2	CCl_2	66	[b]
CCl_3	CCl_3	14	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
CCl_4	CCl_4	−24.6	7007
C_2Cl_4	C_2Cl_4	−2.9	7007
C_2Cl_5	C_2Cl_5	9.1	[b]
F_3Cl	F_3Cl	−39.0	7007
MgCl	MgCl	−10.4	7004
$MgCl_2$	$MgCl_2$	−95.85	7004
Mg_2Cl_4	Mg_2Cl_4	−233	[c] 7006
$SiCl_3$	$SiCl_3$	−102.4	[b]
$SiCl_4$	$SiCl_4$	−157.03	7007
PCl	PCl	28.4	[b]
PCl_2	PCl_2	−21	[b]
PCl_3	PCl_3	−68.6	7007
P_2Cl_4	P_2Cl_4	−106	[a, b] 7120
CH_2Cl	CH_2Cl	29	[a] 7016
CH_3Cl	CH_3Cl	−19.32	7007
C_2H_3Cl	C_2H_3Cl	8.5	7007
C_2H_4Cl	CH_2CH_2Cl	19.07	[h]
C_2H_5Cl	C_2H_5Cl	−26.81	7007
C_3H_3Cl	$CH_3C{\equiv}CCl$	37	[i]
C_3H_4Cl	$CHCl{=}CHCH_2$	23	[h]
C_3H_4Cl	$CH_2{=}CClCH_2$	22	[h]
C_3H_7Cl	*n*-C_3H_7Cl	−31.05	7065
C_3H_7Cl	*iso*-C_3H_7Cl	−36.15	7065
C_4H_9Cl	*sec*-C_4H_9Cl	−38.7	7066
C_4H_9Cl	*n*-C_4H_9Cl	−35.4	7066
C_4H_9Cl	*iso*-C_4H_9Cl	−38.2	7066
C_4H_9Cl	*tert*-C_4H_9Cl	−43.1	7066
C_5H_9Cl	chlorocyclopentane	−26	[i]
$C_5H_{11}Cl$	*n*-$C_5H_{11}Cl$	−40	[h]
C_6H_5Cl	chlorobenzene	12.7	7064
C_7H_6Cl	*p*-chlorobenzyl radical	30	[i]
C_7H_7Cl	*m*-chlorotoluene	3.5	[i]
C_7H_7Cl	*p*-chlorotoluene	3.5	[i]
C_7H_7Cl	*o*-chlorotoluene	4.6	7064
C_7H_7Cl	benzyl chloride	7.1	[h]
C_7H_9Cl	*exo*-5-chloro-2-norbornene	23	[a] 7227
C_7H_9Cl	*endo*-5-chloro-2-norbornene	23	[a] 7227
C_7H_9Cl	3-chloronortricyclene	15	[a] 7227
$CHCl_2$	$CHCl_2$	31	[b]
CH_2Cl_2	CH_2Cl_2	−22.10	7007
$C_2H_2Cl_2$	$CH_2{=}CCl_2$	.58	7007
$C_2H_2Cl_2$	*trans*-$C_2H_2Cl_2$	1.47	7007
$C_2H_2Cl_2$	*cis*-$C_2H_2Cl_2$	.90	7007
$C_2H_4Cl_2$	CH_2ClCH_2Cl	−31.02	7007
$C_3H_4Cl_2$	$CH_2{=}CClCH_2Cl$	−8.04	[h]
$C_3H_6Cl_2$	1,3-$C_3H_6Cl_2$	−34.79	[h]
$C_3H_6Cl_2$	1,2-$C_3H_6Cl_2$	−36	[h]
$C_6H_4Cl_2$	*m*-dichlorobenzene	6.7	7064
$C_6H_4Cl_2$	*p*-dichlorobenzene	6.0	7064
$C_6H_4Cl_2$	*o*-dichlorobenzene	7.8	7064
$CHCl_3$	$CHCl_3$	−24.65	7007
C_2HCl_3	C_2HCl_3	−1.86	7007
$C_2H_2Cl_4$	$CHCl_2CHCl_2$	−35.7	7007
CNCl	CNCl	32.97	7007
CFCl	CFCl	48	[a] 7008
CF_3Cl	CF_3Cl	−166	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_2F_3Cl	C_2F_3Cl	−132.7	7007
CF_2Cl_2	CF_2Cl_2	−114	7007
$CFCl_3$	$CFCl_3$	−66	7007
$C_2F_3Cl_3$	$CFCl_2CF_2Cl$	−181.5	7007
ClO_3F	ClO_3F	−5.7	7007
$SiHCl_3$	$HSiCl_3$	−122.6	7007
POCl	POCl	51.5	[b]
$POCl_2$	$POCl_2$	−92.3	[b]
$POCl_3$	$POCl_3$	−133.48	7007
C_5H_4NCl	4-chloropyridine	26	[i]
C_5H_4NCl	2-chloropyridine	26	[i]
$C_8H_{10}NCl$	*N*,*N*-dimethyl-*p*-chloroaniline	12	[h]
C_2H_2OCl	CH_2ClCO	−12	[i]
C_2H_3OCl	CH_3COCl	−58.20	7007
C_2H_5OCl	CH_2ClCH_2OH	−59	[d] 7001
C_3H_5OCl	CH_3COCH_2Cl	−56.7	[h]
C_3H_5OCl	epichlorohydrin	−27	7014
C_6H_5OCl	*p*-chlorophenol	−33.9	[h]
C_6H_5OCl	*o*-chlorophenol	−32.9	[h]
C_7H_5OCl	*p*-chlorobenzaldehyde	−20.9	[h]
C_7H_5OCl	benzoyl chloride	−28.9	[d] 7104
C_8H_7OCl	α-chloroacetophenone	−24.5	[h]
C_8H_7OCl	*p*-chloroacetophenone	−28.7	[h]
C_8H_7OCl	*p*-methylbenzoyl chloride	−28.7	[h]
$C_{13}H_9OCl$	*p*-chlorobenzophenone	3.4	[h]
$C_3H_5O_2Cl$	$CH_2ClCOOCH_3$	−104.8	[h]
$C_4H_7O_2Cl$	$CH_2ClCOOC_2H_5$	−109.8	[h]
$C_8H_7O_2Cl$	*p*-methoxybenzoyl chloride	−55.9	[h]
$C_8H_7O_2Cl$	methyl *p*-chlorobenzoate	−76.9	[h]
$C_7H_4OCl_2$	*p*-chlorobenzoyl chloride	−28.6	[h]
C_2H_2FCl	*cis*-C_2H_2FCl	−36	[h]
C_2H_2FCl	*trans*-C_2H_2FCl	−37	[h]
C_6H_4FCl	*m*-chlorofluorobenzene	−32	[h]
C_6H_4FCl	*p*-chlorofluorobenzene	−32	[h]
C_6H_4FCl	*o*-chlorofluorobenzene	−31	[h]
CHF_2Cl	CHF_2Cl	−113	7004
C_2HF_2Cl	*cis*-C_2HF_2Cl	−80	[h]
C_2HF_2Cl	*trans*-C_2HF_2Cl	−80	[h]
$CHFCl_2$	$CHFCl_2$	−69	7004
C_3H_9SiCl	$(CH_3)_3SiCl$	−84.32	7007
CH_3SiCl_3	CH_3SiCl_3	−126.4	7004
$C_2H_3SiCl_3$	$CH_2{=}CHSiCl_3$	−101	[i]
$C_2H_5SiCl_3$	$C_2H_5SiCl_3$	−131	[i]
$C_3H_7SiCl_3$	*iso*-$C_3H_7SiCl_3$	−138	[i]
$C_3H_7SiCl_3$	*n*-$C_3H_7SiCl_3$	−136.3	[i]
C_4H_3ClS	2-chlorothiophene	17	[i]
$C_7H_4NO_3Cl$	*p*-nitrobenzoyl chloride	−27.1	[h]
K	K	21.31	7004
Ca	Ca	46.04	7001
CaO	CaO	13	[f] 7191
CaF	CaF	−63.9	7156
CaF_2	CaF_2	−188.0	7157
CaCl	CaCl	6.7	7001
Sc	Sc	90.98	7158
ScF_3	ScF_3	−279	7230

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	$\Delta H^\circ_{f298}(g)$ (kcal mol^{-1})	Reference
Ti	Ti	112.7	7140
V	V	120	7001
$C_9H_5O_4V$	cyclopentadienylvanadium tetracarbonyl	−180	[a, d] 7149, 7185
Cr	Cr	94.8	7140
CrO	CrO	53	[f] 7194
CrO_2	CrO_2	−13	[f] 7194
CrO_3	CrO_3	−68	[f] 7194
CrF	CrF	7.3	[f] 7160
CrF_2	CrF_2	−99	7140
CrC_6O_6	$Cr(CO)_6$	−240.4	7103
CrO_2Cl_2	CrO_2Cl_2	−128.6	7001
Mn	Mn	68.34	7001
MnF	MnF	−13.4	7231
MnF_2	MnF_2	−113.4	7231
$C_8H_5O_3Mn$	cyclopentadienylmanganese tricarbonyl	−108	[d] 7185
Fe	Fe	99.5	7004
FeF	FeF	11.4	7004
FeF_2	FeF_2	−93.1	7004
$FeCl_2$	$FeCl_2$	−35.50	7004
Fe_2Cl_4	Fe_2Cl_4	−105	7140
FeC_5O_5	$Fe(CO)_5$	−175.4	7140
Co	Co	101.5	7140
$C_7H_5O_2Co$	cyclopentadienylcobalt dicarbonyl	−56	[a, d] 7149, 7185
Ni	Ni	102.7	7140
Ni_2	Ni_2	150	7140
NiO	NiO	76	[f] 7234
NiF_2	NiF_2	−76.3	[c] 7140, 7233
NiCl	NiCl	15	7001
$NiCl_2$	$NiCl_2$	−27.1	7001
NiC_4O_4	$Ni(CO)_4$	−144.10	7140
Cu	Cu	81.0	7004
CuF	CuF	12	7004
CuF_2	CuF_2	−68.7	7004
Ge	Ge	90.0	7007
GeH_3	GeH_3	38.8	[b]
GeH_4	GeH_4	21.7	7007
Ge_2H_6	Ge_2H_6	38.8	7007
Ge_3H_8	Ge_3H_8	54.2	7007
GeO	GeO	−11.04	7007
Ge_2O_2	Ge_2O_2	−112	7007
Ge_3O_3	Ge_3O_3	−212	7007
$C_4H_{12}Ge$	$(CH_3)_4Ge$	−35	[g] 7088
$GeSiH_6$	$GeSiH_6$	27.8	7198
As	As	72.3	7007
As_4	As_4	34.4	7007
AsH_3	AsH_3	15.88	7007
As_2H_4	As_2H_4	41	[a] 7179
$AsCl_3$	$AsCl_3$	−61.80	7007
C_3H_9As	$(CH_3)_3As$	3.7	7260
$C_{18}H_{15}As$	triphenylarsine	99.5	[d] 7117
Se	Se	54.27	7007
Br	Br	26.741	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
Br^-	Br^-	−55.9	7007
Br_2	Br_2	7.387	7007
HBr	HBr	−8.70	7007
LiBr	LiBr	−34.439	7004
Li_2Br_2	Li_2Br_2	−117.892	7004
BBr_3	BBr_3	−49.15	7007
CBr	CBr	133	[b]
CBr_2	CBr_2	95	[b]
CBr_3	CBr_3	42	7007
CBr_4	CBr_4	19	7007
BrF	BrF	−22.43	7007
BrF_3	BrF_3	−61.09	7007
BrF_5	BrF_5	−102.5	7007
MgBr	MgBr	−13	7004
$MgBr_2$	$MgBr_2$	−74.6	7004
Mg_2Br_4	Mg_2Br_4	−187	[c] 7006
BrCl	BrCl	3.50	7007
$FeBr_2$	$FeBr_2$	−11	7140
Fe_2Br_4	Fe_2Br_4	−63	7140
CH_2Br	CH_2Br	46.3	[b]
CH_3Br	CH_3Br	−8.4	7007
C_2H_3Br	C_2H_3Br	17	[h]
C_2H_4Br	CH_2CH_2Br	31	[h]
C_2H_5Br	C_2H_5Br	−15.42	7007
C_3H_3Br	$CH_3C{\equiv}CBr$	49	[i]
C_3H_3Br	$CH{\equiv}CCH_2Br$	51	[h]
C_3H_5Br	$CH_3CH{=}CHBr$	9.7	[h]
C_3H_7Br	*iso*-C_3H_7Br	−23.99	[c] 7219
C_3H_7Br	*n*-C_3H_7Br	−18.65	[c] 7219
C_4H_9Br	*n*-C_4H_9Br	−25.67	7255
C_4H_9Br	*iso*-C_4H_9Br	−24.26	[h]
C_4H_9Br	*sec*-C_4H_9Br	−24.26	[h]
C_4H_9Br	*tert*-C_4H_9Br	−27.56	[h]
$C_5H_{11}Br$	*n*-$C_5H_{11}Br$	−27.84	[h]
C_6H_5Br	bromobenzene	24	[h]
C_7H_7Br	*m*-bromotoluene	14.9	[h]
C_7H_7Br	*o*-bromotoluene	15.9	[h]
C_7H_7Br	benzyl bromide	19.1	[h]
C_7H_7Br	*p*-bromotoluene	14.9	[h]
$CHBr_2$	$CHBr_2$	50.1	[b]
CH_2Br_2	CH_2Br_2	−1	7001
$C_2H_2Br_2$	*trans*-$C_2H_2Br_2$	22	[h]
$C_2H_2Br_2$	*cis*-$C_2H_2Br_2$	23	[h]
$C_2H_4Br_2$	CH_3CHBr_2	−7	[h]
$C_3H_6Br_2$	1,3-$C_3H_6Br_2$	−10.8	[h]
$CHBr_3$	$CHBr_3$	4	7007
C_2HBr_3	C_2HBr_3	26.19	[h]
CNBr	CNBr	44.5	7007
CF_3Br	CF_3Br	−153.6	7007
CCl_3Br	CCl_3Br	−11.0	7007
C_5H_4NBr	4-bromopyridine	38	[i]
C_5H_4NBr	2-bromopyridine	38	[i]
$C_8H_{10}NBr$	*N*,*N*-dimethyl-*p*-bromoaniline	24	[h]
$C_{10}H_{14}NBr$	*N*,*N*-diethyl-*p*-bromoaniline	14.1	[h]
C_2H_3OBr	CH_3COBr	−46.6	7040

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
C_3H_5OBr	epibromohydrin	−15	[i]
C_6H_5OBr	*p*-bromophenol	−21.9	[h]
C_7H_5OBr	*p*-bromobenzaldehyde	−8.9	[h]
C_7H_5OBr	benzoyl bromide	−14.7	[d] 7104
C_8H_7OBr	*p*-bromoacetophenone	−16.7	[h]
$C_{13}H_9OBr$	*p*-bromobenzophenone	15.4	[h]
$C_3H_5O_2Br$	$CH_2BrCOOCH_3$	−92.8	[h]
$C_8H_7O_2Br$	methyl *p*-bromobenzoate	−64.9	[h]
C_6H_4FBr	*p*-bromofluorobenzene	−20	[h]
$C_2H_2F_2Br_2$	CF_2BrCH_2Br	−90	[h]
C_3H_9SiBr	$(CH_3)_3SiBr$	−65	[a] 7139
C_4H_3BrS	2-bromothiophene	29	[i]
CH_2ClBr	CH_2ClBr	−12	7012
C_2H_4ClBr	CH_2BrCH_2Cl	−18	[h]
$CHCl_2Br$	$CHCl_2Br$	−14	7012
Sr	Sr	39.2	7001
SrO	SrO	−3.4	[f] 7191
Sr_2O	Sr_2O	−56	[f] 7191
SrF	SrF	−5	7001
SrF_2	SrF_2	−186.6	[c] 7001, 7261
SrCl	SrCl	9	7001
Y	Y	101.52	7158
YC_2	YC_2	143	[c] 7218
YO	YO	−7.5	[f] 7237
YF_3	YF_3	−295.7	7230
YCl_3	YCl_3	−178	[c] 7193
Zr	Zr	145.42	7004
Nb	Nb	184.5	7001
Mo	Mo	157.3	7004
MoO	MoO	101	7140
MoO_2	MoO_2	3	7140
MoO_3	MoO_3	−78	7140
Mo_2O_6	Mo_2O_6	−271	7140
Mo_3O_9	Mo_3O_9	−451	7140
MoC_6O_6	$Mo(CO)_6$	−218.0	7140
$SrMoO_3$	$SrMoO_3$	−139	[f] 7192
$SrMoO_4$	$SrMoO_4$	−257	[f] 7192
Ru	Ru	153.6	7140
RuO_4	RuO_4	−44.0	7140
Rh	Rh	133.1	7140
RhO	RhO	89	7202
RhO_2	RhO_2	40	7202
Pd	Pd	90.4	7140
Ag	Ag	68.01	7140
Cd	Cd	26.77	7007
$CdCl_2$	$CdCl_2$	−51.8	7001
In	In	58.15	7007
In_2	In_2	91.04	7007
InO	InO	92.5	7007
In_2O	In_2O	−3	[c] 7170
Sn	Sn	72.2	7007
SnH_4	SnH_4	38.9	7007
Sn_2H_6	Sn_2H_6	65	[a] 7179
SnO	SnO	3.6	7140
Sn_2O_2	Sn_2O_2	−60	7140

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
Sn_3O_3	Sn_3O_3	−126	7140
Sn_4O_4	Sn_4O_4	−193	7140
SnS	SnS	28.5	7007
Sn_2S_2	Sn_2S_2	8.3	[c] 7238
SnSe	SnSe	30.8	7007
Sn_2Se_2	Sn_2Se_2	15	[f] 7206
C_3H_9Sn	$(CH_3)_3Sn$	14.7	[b]
$C_4H_{12}Sn$	$(CH_3)_4Sn$	−4.5	7007
$C_5H_{14}Sn$	$(CH_3)_3SnC_2H_5$	−7	7007
$C_6H_{16}Sn$	n-$C_3H_7Sn(CH_3)_3$	−12	[i]
$C_6H_{16}Sn$	$(C_2H_5)_3SnH$	−16.3	7256
$C_6H_{18}Sn_2$	$(CH_3)_3SnSn(CH_3)_3$	−11.6	[d] 7007
Sb	Sb	62.7	7007
Sb_2	Sb_2	56.3	7007
Sb_4	Sb_4	49.0	7007
SbH_3	SbH_3	34.681	7007
Sb_2H_4	Sb_2H_4	59	[a] 7179
InSb	InSb	82.3	7007
$InSb_2$	$InSb_2$	75	7007
$C_{18}H_{15}Sb$	triphenylstilbene	87.0	[d] 7117
Te	Te	47.02	7007
Te_2	Te_2	40.2	7007
GeTe	GeTe	42	7007
$GeTe_2$	$GeTe_2$	44	7007
SnTe	SnTe	38.4	7007
I	$I(^2P_{3/2})$	25.535	7007
I	$I(^2P_{1/2})$	47.27	7007, 7241
I^-	I^-	−47.0	7007
I_2	I_2	14.923	7007
HI	HI	6.33	7007
LiI	LiI	−19.10	7004
Li_2I_2	Li_2I_2	−81.78	7004
BI_3	BI_3	17.00	7007
IF	IF	−22.86	7007
IF_5	IF_5	−196.58	7007
MgI	MgI	−2.5	[b]
MgI_2	MgI_2	−41	[c] 7001, 7006
Mg_2I_4	Mg_2I_4	−113.4	[c] 7006
ICl	ICl	4.25	7007
IBr	IBr	9.76	7007
CH_3I	CH_3I	3.1	7007
C_2H_5I	C_2H_5I	−1.84	7007
C_3H_3I	$CH{\equiv}CCH_2I$	64	[h]
C_3H_7I	n-C_3H_7I	−5.77	7065
C_3H_7I	*iso*-C_3H_7I	−10.45	7065
C_4H_7I	$CH_2{=}C(CH_3)CH_2I$	14	[i] 7076
C_4H_7I	$CH_3CH{=}CHCH_2I$	15	[i] 7076
C_4H_9I	*sec*-C_4H_9I	−11.26	[h]
C_4H_9I	n-C_4H_9I	−9.91	[h]
C_4H_9I	*iso*-C_4H_9I	−11.26	[h]
C_4H_9I	*tert*-C_4H_9I	−14.56	[h]
$C_5H_{11}I$	n-$C_5H_{11}I$	−14.84	[h]
C_6H_5I	iodobenzene	37	[h]
C_7H_7I	*o*-iodotoluene	28.9	[h]
C_7H_7I	*p*-iodotoluene	27.9	[h]
C_7H_7I	*m*-iodotoluene	27.9	[h]
CH_2I_2	CH_2I_2	27.0	7007

Appendix 1. Heats of Formation Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
CHI_3	CHI_3	50	7012
CNI	CNI	53.9	7007
CF_3I	CF_3I	−141	7012
$C_8H_{10}NI$	*N*,*N*-dimethyl-*p*-iodoaniline	37	[h]
C_6H_4ClI	*o*-chloroiodobenzene	29	[h]
Cs	Cs	18.83	7001
CsCl	CsCl	−62.4	7001
CsI	CsI	−42	[c] 7001, 7161
Cs_2I_2	Cs_2I_2	−121	[c] 7001, 7161
Ba	Ba	41.96	7001
BaO	BaO	−44.4	7001
BaF	BaF	−9	7001
BaCl	BaCl	24	7001
BaI_2	BaI_2	−84	[c,d] 7001, 7161
BaOH	BaOH	−68.5	[c] 7180
La	La	102.96	7158
LaF_3	LaF_3	−326	7230
Ce	Ce	111.60	7158
CeF_3	CeF_3	−330	7230
Pr	Pr	89.09	7158
Nd	Nd	78.33	7158
Sm	Sm	48.59	7158
Eu	Eu	41.92	7158
Gd	Gd	95.75	7158
Tb	Tb	93.96	7158
Dy	Dy	70.91	7158
Ho	Ho	70.6	7169
Er	Er	81.79	7158
Tm	Tm	59.1	7176
Yb	Yb	36.33	7158
Lu	Lu	102.16	7158
Ta	Ta	186.8	7159
TaO	TaO	62	7262
TaO_2	TaO_2	−44	7262
W	W	203.0	7140
WO	WO	108	7140
WO_2	WO_2	11	7140
WO_3	WO_3	−71	7140
W_2O_6	W_2O_6	−277	7140
W_3O_9	W_3O_9	−468	7140
WC_6O_6	$W(CO)_6$	−208.3	7140
$CaWO_3$	$CaWO_3$	−117	[f] 7192
$CaWO_4$	$CaWO_4$	−223	[f] 7192
$SrWO_3$	$SrWO_3$	−144	[f] 7192
$SrWO_4$	$SrWO_4$	−251	[f] 7192
$SnWO_4$	$SnWO_4$	−192	[f] 7192
Sn_2WO_5	Sn_2WO_5	−252	[f] 7192
Re	Re	189	7001
Re_3Cl_9	Re_3Cl_9	−140	7212
Re_3Br_9	Re_3Br_9	−70	7212
Os	Os	189	7140
OsO_3	OsO_3	−67.8	7140
OsO_4	OsO_4	−80.6	7140
Ir	Ir	159.0	7140
IrO	IrO	104	[b]
IrO_2	IrO_2	48.5	[c] 7199
IrO_3	IrO_3	1.9	7140

Appendix 1. Heats of Formula Used in Tables 1 and 2—*Continued*

Formula	Description	ΔH°_{f298}(g) (kcal mol^{-1})	Reference
Hg	Hg	14.652	7004
C_2H_6Hg	$(CH_3)_2Hg$	26.1	7001
$C_4H_{10}Hg$	$(C_2H_5)_2Hg$	25.1	7001
$C_6H_{14}Hg$	$(iso\text{-}C_3H_7)_2Hg$	12.54	[i]
$C_8H_{18}Hg$	$(n\text{-}C_4H_9)_2Hg$	5.38	[i]
CH_3HgCl	CH_3HgCl	−12.08	7213
Tl	Tl	43.55	7007
TlCl	TlCl	−16.2	7007
TlBr	TlBr	−9.0	7007
TlI	TlI	1.7	7007
Pb	Pb	46.6	7007
PbH_4	PbH_4	64	[a] 7181
PbO	PbO	17.1	[c] 7171
Pb_2O_2	Pb_2O_2	−29.2	[c] 7171
Pb_3O_3	Pb_3O_3	−75.1	[c] 7171
Pb_4O_4	Pb_4O_4	−134	[c] 7171
PbS	PbS	31.7	[c] 7007, 7238
Pb_2S_2	Pb_2S_2	18.6	[c] 7238
$PbCl_2$	$PbCl_2$	−50.6	7001, 7007
$C_4H_{12}Pb$	$(CH_3)_4Pb$	32.48	7007
Bi	Bi	49.5	7007
Bi_2	Bi_2	52.5	7007
BiH_3	BiH_3	65	[a] 7181
BiS	BiS	43	7007
$C_{18}H_{15}Bi$	triphenylbismuth	119.6	7117
U	U	125	7001
UO	UO	6	[f] 7200
UO_2	UO_2	−96	[f] 7200
UO_3	UO_3	−189	[f] 7200

[a] Calculated from appearance potential data.
[b] Calculated from average or estimated bond energies.
[c] Calculated from measured heats of combustion, reaction, etc.
[d] Calculated using estimated heats of vaporization, sublimation, etc.
[e] Average value.
[f] Calculated from atomization energies.
[g] Calculated using group equivalents.
[h] Calculated using group equivalents from appendix 2.
[i] Calculated using measured heats of formation and group equivalents from appendix 2.

8. Bibliography for Appendix 1*

7001. Rossini, F. D., Wagman, D. D., Evans, W. H., Levine, S., and Jaffe, I., NBS Circ. 500, U.S. Government Printing Office, Washington, D.C. 20402 (1952).
7004. JANAF Thermochemical Tables, The Dow Chemical Company, available from Clearinghouse for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Va. 22151, PB168 370 (1965), Addendum PB168 370–1 (1966), and Addendum PB168 370–2 (1967).
7006. Berkowitz, J., and Marquart, J. R., J. Chem. Phys. **37**, 1853 (1962).
7007. Wagman, D. D., Evans, W. H., Parker, V. B., Halow, I., Bailey, S. M., and Schumm, R. H., NBS Tech. Note 270–3, U.S. Government Printing Office, Washington, D.C. 20402 (1968).
7008. Hobrock, D. L., Ph. D. Thesis, Kansas State University (1965).
7009. Margrave, J. L., Nature **197**, 376 (1963).
7012. Maslov, P. G., and Maslov, Yu. P., Khim. i Tekhnol. Topliv i Masel **3**, 50 (1958); (CA **53**, 1910h (1959)).
7014. Wada, Y., and Kiser, R. W., J. Phys. Chem. **66**, 1652 (1962).
7016. Harrison, A. G., and Shannon, T. W., Can. J. Chem. **40**, 1730 (1962).
7018. Bernecker, R. R., and Long, F. A., J. Phys. Chem. **65**, 1565 (1961).
7019. Mackle, H., and Mayrick, R. G., Trans. Faraday Soc. **58**, 33 (1962).
7020. Steele, W. C., Nichols, L. D., and Stone, F. G. A., J. Am. Chem. Soc. **84**, 1154 (1962).
7024. Franklin, J. L., Dibeler, V. H., Reese, R. M., and Krauss, M., J. Am. Chem. Soc. **80**, 298 (1958).
7026. Hobrock, B. G., and Kiser, R. W., J. Phys. Chem. **67**, 1283 (1963).
7028. Wada, Y., Ph. D. Thesis, Kansas State University (1964).
7029. Harshman, R. C., Jet Propulsion **27**, 398 (1957).

*Note that the numbering is not continuous and should cause no concern.

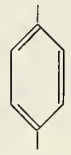
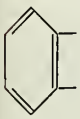
7030. Dibeler, V. H., Reese, R. M., and Franklin, J. L., J. Am. Chem. Soc. **83,** 1813 (1961).
7031. Kiser, R. W., and Hobrock, B. G., J. Phys. Chem. **66,** 957 (1962).
7034. Bryant, W. M. D., J. Polymer Sci. **56,** 277 (1962).
7036. Coats, F. H., and Anderson, R. C., J. Am. Chem. Soc. **79,** 1340 (1957).
7037. Kolesov, V. P., Martynov, A. M., Shtekher, S. M., and Skuratov, S. M., Zh. Fiz. Khim. **36,** 2078 (1962).
7039. Harrison, A. G., and Lossing, F. P., J. Am. Chem. Soc. **82,** 519 (1960).
7040. Carson, A. S., and Skinner, H. A., J. Chem. Soc., 936 (1949).
7042. Steele, W. C., and Stone, F. G. A., J. Am. Chem. Soc. **84,** 3450 (1962).
7043. Sunner, S., Acta Chem. Scand. **9,** 847 (1955).
7044. Majer, J. R., Patrick, C. R., and Robb, J. C., Trans. Faraday Soc. **57,** 14 (1961).
7045. Rossini, F. D., Pitzer, K. S., Arnett, R. L., Braun, R. M., and Pimentel, G. C., Selected Values of Physical and Thermodynamic Properties of Hydrocarbons and Related Compounds, American Petroleum Institute Research Project 44, Pittsburgh (1953).
7046. Green, J. H. S., Quart. Rev. **15,** 125 (1961).
7048. Gray, P., and Williams, A., Chem. Rev. **59,** 239 (1959).
7051. Hubbard, W. N., Douslin, D. R., McCullough, J. P., Scott, D. W., Todd, S. S., Messerly, J. F., Hossenlopp, I. A., George, A., and Waddington, G., J. Am. Chem. Soc. **80,** 3547 (1958).
7053. Duus, H. C., Ind. Eng. Chem. **47,** 1445 (1955).
7055. Wiberg, K. B., Bartley, W. J., and Lossing, F. P., J. Am. Chem. Soc. **84,** 3980 (1962).
7056. Reed, R. I., and Brand, J. C. D., Trans. Faraday Soc. **54,** 478 (1958).
7057. Munson, M. S. B., and Franklin, J. L., J. Phys. Chem. **68,** 3191 (1964).
7058. Knowlton, J. W., and Rossini, F. D., J. Res. NBS **43,** 113 (1949) RP2012.
7059. Kharasch, M. S., J. Res. NBS **2,** 359 (1929) RP41.
7060. Gallegos, E. J., and Kiser, R. W., J. Phys. Chem. **66,** 136 (1962).
7061. Sinke, McDonald, and Stull, private communication to P. Gray and A. Williams as quoted in Trans. Faraday Soc. **55,** 760 (1959).
7062. Hubbard, W. N., Katz, C., and Waddington, G., J. Phys. Chem. **58,** 142 (1954).
7063. Hobrock, B. G., and Kiser, R. W., J. Phys. Chem. **66,** 1551 (1962).
7064. Cox, J. D., Tetrahedron **18,** 1337 (1962).
7065. Mortimer, C. T., Pritchard, H. O., and Skinner, H. A., Trans. Faraday Soc. **48,** 220 (1952).
7066. Skinner, H. A., Modern Aspects of Thermochemistry, Royal Institute of Chemistry Monograph **#3,** London (1958).
7067. Hubbard, W. N., Rec. Trav. Chim. **73,** 910 (1954).
7069. Long, L. H., and Sackman, J. F., Trans. Faraday Soc. **53,** 1606 (1957).
7071. Dibeler, V. H., Franklin, J. L., and Reese, R. M., J. Am. Chem. Soc. **81,** 68 (1959).
7073. Guthrie, G. B., Jr., Scott, D. W., Hubbard, W. N., Katz, C., McCullough, J. P., Gross, M. E., Williamson, K. D., and Waddington, G., J. Am. Chem. Soc. **74,** 4662 (1952).
7074. Nicholson, G. R., Szwarc, M., and Taylor, J. W., J. Chem. Soc., 2767 (1954).
7075. McDowell, C. A., Lossing, F. P., Henderson, I. H. S., and Farmer, J. B., Can. J. Chem. **34,** 345 (1956).
7076. Gellner, O. H., and Skinner, H. A., J. Chem. Soc .,1145 (1949).
7077. Coops, J., and Kaarsemaker, Sj., Rec. Trav. Chim. **69,** 1364 (1950).
7079. Cass, R. C., Fletcher, S. E., Mortimer, C. T., Springall, H. D., and White, T. R., J. Chem. Soc., 1406 (1958).
7080. Van Raalte, D., and Harrison, A. G., Can. J. Chem. **41,** 2054 (1963).
7081. Schjanberg, E., Z. Physik. Chem. **A172,** 197 (1935).
7083. Hobrock, B. G., and Kiser, R. W., J. Phys. Chem. **67,** 648 (1963).
7084. Szwarc, M., Discussions Faraday Soc. **10,** 336 (1951).
7085. Hissel, J., Bull. Soc. Roy. Sci. Liege **21,** 457 (1952).
7086. Skinner, H. A., and Snelson, A., Trans. Faraday Soc. **56,** 1776 (1960).
7087. Hubbard, W. N., Good, W. D., and Waddington, G., J. Phys. Chem. **62,** 614 (1958).
7088. Hobrock, B. G., and Kiser, R. W., J. Phys. Chem. **66,** 155 (1962).
7091. Martin, R. H., Lampe, F. W., and Taft, R. W., J. Am. Chem. Soc. **88,** 1353 (1966).
7096. Taubert, R., and Lossing, F. P., J. Am. Chem. Soc. **84,** 1523 (1962).
7097. Scott, D. W., McCullough, J. P., Good, W. D., Messerly, J. F., Pennington, R. E., Kincheloe, T. C., Hossenlopp, I. A., Douslin, D. R., and Waddington, G., J. Am. Chem. Soc. **78,** 5457 (1956).
7100. Andon, R. J. L., Biddiscombe, D. P., Cox, J. D., Handley, R., Harrop, D., Herington, E. F. G., and Martin, J. F., J. Chem. Soc., 5246 (1960).
7101. Scott, D. W., McCullough, J. P., Hubbard, W. N., Messerly, J. F., Hossenlopp, I. A., Frow, F. R., and Waddington, G., J. Am. Chem. Soc. **78,** 5463 (1956).
7102. Coates, G. E., and Sutton, L. E., J. Chem. Soc., 1187 (1948).
7103. Cotton, F. A., Fischer, A. K., and Wilkinson, G., J. Am. Chem. Soc. **78,** 5168 (1956).
7104. Carson, A. S., Pritchard, H. O., and Skinner, H. A., J. Chem. Soc., 656 (1950).
7105. Scott, D. W., Douslin, D. R., Messerly, J. F., Todd, S. S., Hossenlopp, I. A., Kincheloe, T. C., and McCullough, J. P., J. Am. Chem. Soc. **81,** 1015 (1959).
7106. Glaser, F., and Ruland, H., Chem. Ingr.-Tech. **29,** 772 (1957).
7107. Szwarc, M., Chem. Rev. **47,** 75 (1956).
7108. Meyer, F., Haynes, P., McLean, S., and Harrison, A. G., Can. J. Chem. **43,** 211 (1965).
7109. Finke, H. L., Scott, D. W., Gross, M. E., Messerly, J. F., and Waddington, G., J. Am. Chem. Soc. **78,** 5469 (1956).
7110. Lifshitz, C., and Bauer, S. H., J. Phys. Chem. **67,** 1629 (1963).
7111. Kybett, B. D., Carroll, S., Natalis, P., Bonnell, D. W., Margrave, J. L., and Franklin, J. L., J. Am. Chem. Soc. **88,** 626 (1966).
7112. Harrison, A. G., Honnen, L. R., Dauben, H. J., Jr., and Lossing, F. P., J. Am. Chem. Soc. **82,** 5593 (1960).
7113. Huffman, H. M., and Ellis, E. L., J. Am. Chem. Soc. **57,** 41 (1935).
7114. Bradley, R. S., and Cleasby, T. G., J. Chem. Soc., 1690 (1953).
7115. Bender, P., and Farber, J., J. Am. Chem. Soc. **74,** 1450 (1952).
7116. Benson, S. W., and Buss, J. H., J. Phys. Chem. **61,** 104 (1957).
7117. Birr, K.-H., Z. Anorg. Allgem. Chem. **311,** 92 (1961).
7118. Bedford, A. F., and Mortimer, C. T., J. Chem. Soc., 1622 (1960).
7120. Sandoval, A. A., Moser, H. C., and Kiser, R. W., J. Phys. Chem. **67,** 124 (1963).
7121. Reese, R. M., Dibeler, V. H., and Franklin, J. L., J. Chem. Phys. **29,** 880 (1958).
7129. Nelson, R. A., and Jessup, R. S., J. Res. NBS **48,** 206 (1952).
7130. Stevenson, D. P., Discussions Faraday Soc. **10,** 35 (1951).
7132. Gowenlock, B. G., Jones, P. P., and Majer, J. R., Trans. Faraday Soc. **57,** 23 (1961).
7134. Cass, R. C., Fletcher, S. E., Mortimer, C. T., Quincey, P. G., and Springall, H. D., J. Chem. Soc., 958 (1958).
7135. Tannenbaum, S., J. Am. Chem. Soc. **76,** 1027 (1954).
7136. Collin, J., and Lossing, F. P., J. Am. Chem. Soc. **79,** 5848 (1957).
7138. Dibeler, V. H., and Liston, S. K., J. Chem. Phys. **48,** 4765 (1968).
7139. Hess, G. G., Lampe, F. W., and Sommer, L. H., J. Am. Chem. Soc. **87,** 5327 (1965).

7140. Evans, W. H., private communication.
7141. Tjebbes, J., Acta Chem. Scand. **16,** 916 (1962).
7142. Akopyan, M. E., and Vilesov, F. I., Kinetika i Kataliz **4,** 39 (1963).
7143. Cox, J. D., Challoner, A. R., and Meetham, A. R., J. Chem. Soc., 265 (1954).
7148. Good, W. D., Lacina, J. L., Scott, D. W., and McCullough, J. P., J. Phys. Chem. **66,** 1529 (1962).
7149. Winters, R. E., and Kiser, R. W., J. Organometal. Chem. **4,** 190 (1965).
7154. Egan, C. J., J. Chem. Eng. Data **8,** 532 (1963).
7156. Blue, G. D., Green, J. W., Bautista, R. G., and Margrave, J. L., J. Phys. Chem. **67,** 877 (1963).
7157. Hildenbrand, D. L., and Murad, E., J. Chem. Phys. **43,** 1400 (1965).
7158. Habermann, C. E., and Daane, A. H., J. Chem. Phys. **41,** 2818 (1964).
7159. Stull, D. R., and Sinke, G. C., Advan. Chem. Ser. **18** (1956).
7160. Kent, R. A., and Margrave, J. L., J. Am. Chem. Soc. **87,** 3582 (1965).
7161. Winchell, P., Nature **206,** 1252 (1965).
7166. Foner, S. N., and Hudson, R. L., J. Chem. Phys. **23,** 1364 (1955).
7167. Foner, S. N., and Hudson, R. L., J. Chem. Phys. **28,** 719 (1958).
7169. Wakefield, G. F., Daane, A. H., and Spedding, F. H., J. Chem. Phys. **47,** 4994 (1967).
7170. Burns, R. P., DeMaria, G., Drowart, J., and Inghram, M. G., J. Chem. Phys. **38,** 1035 (1963).
7171. Drowart, J., Colin. R., and Exsteen, G., Trans. Faraday Soc. **61,** 1376 (1965).
7176. Spedding, F. H., Barton, R. J., and Daane, A. H., J. Am. Chem. Soc. **79,** 5160 (1957).
7179. Saalfeld, F. E., and Svec, H. J., Inorg. Chem. **2,** 50 (1963).
7180. Stafford, F. E., and Berkowitz, J., J. Chem. Phys. **40,** 2963 (1964).
7181. Saalfeld, F. E., and Svec, H. J., Inorg. Chem. **2,** 46 (1963).
7183. Paulett, G. S., and Ettinger, R., J. Chem. Phys. **39,** 825 (1963).
7184. Gray, P., Trans. Faraday Soc. **52,** 344 (1956).
7185. Evstigneeva, E. V., and Shmyreva, G. O., Zh. Fiz. Khim. **39,** 1000 (1965).
7186. Natalis, P., and Franklin, J. L., J. Phys. Chem. **69,** 2943 (1965).
7187. Kovats, E., Guntherd, H., and Plattner, P. A., Helv. Chim. Acta **38,** 1962 (1955); Helv. Chim. Acta **40,** 2008 (1957).
7188. Heilbronner, E., and Wieland, K., Helv. Chim. Acta **30,** 947 (1947).
7189. Springall, H. D., and White, T. R., J. Chem. Soc., 2764 (1954).
7191. Drowart, J., Exsteen, G., and Verhaegen, G., Trans. Faraday Soc. **60,** 1920 (1964).
7192. Verhaegen, G., Colin, R., Exsteen, G., and Drowart, J., Trans. Faraday Soc. **61,** 1372 (1965).
7193. McKinley, J. D., J. Chem. Phys. **42,** 2245 (1965).
7194. Grimley, R. T., Burns, R. P., and Inghram, M. G., J. Chem. Phys. **34,** 664 (1961).
7195. Weinstock, B., Weaver, E., and Knop, C. P., Inorg. Chem. **5,** 2189 (1966).
7196. Paulett, G. S., and Lustig, M., J. Am. Chem. Soc. **87,** 1020 (1965).
7197. Vaughn, J. D., and Muetterties, E. L., J. Phys. Chem. **64,** 1787 (1960).
7198. Gunn, S. R., and Kindsvater, J. H., J. Phys. Chem. **70,** 1750 (1966).
7199. Norman, J. H., Staley, H. G., and Bell, W. E., J. Chem. Phys. **42,** 1123 (1965).
7200. DeMaria, G., Burns, R. P., Drowart, J., and Inghram, M. G., J. Chem. Phys. **32,** 1373 (1960).
7202. Norman, J. H., Staley, H. G., and Bell, W. E., J. Phys. Chem. **68,** 662 (1964).
7206. Colin, R., and Drowart, J., Trans. Faraday Soc. **60,** 673 (1964).
7207. Ehlert, T. C., and Margrave, J. L., J. Am. Chem. Soc. **86,** 3901 (1964).
7208. DeMaria, G., Gingerich, K. A., Malaspina, L., and Piacente, V., J. Chem. Phys. **44,** 2531 (1966).
7212. Buchler, A., Blackburn, P. E., and Stauffer, J. L., J. Phys. Chem. **70,** 685 (1966).
7213. Hartley, K., Pritchard, H. O., and Skinner, H. A., Trans. Faraday Soc. **46,** 1019 (1950).
7215. Page, M., Pritchard, H. O., and Trotman-Dickenson, A. F., J. Chem. Soc., 3878 (1953).
7217. Cooper, W. J., and Masi, J. F., J. Phys. Chem. **64,** 682 (1960).
7218. DeMaria, G., Guido, M., Malaspina, L., and Pesce, B., J. Chem. Phys. **43,** 4449 (1965).
7219. Lacher, J. R., Walden, C. H., Lea, K. R., and Park, J. D., J. Am. Chem. Soc. **72,** 331 (1950).
7223. Gowenlock, B. G., Majer, J. R., and Snelling, D. R., Trans. Faraday Soc. **58,** 670 (1962).
7224. Wada, Y., and Kiser, R. W., J. Phys. Chem. **68,** 2290 (1964).
7225. McCullough, J. P., Sunner, S., Finke, H. L., Hubbard, W. N., Gross, M. E., Pennington, R. E., Messerly, J. F., Good, W. D., and Waddington, G., J. Am. Chem. Soc. **75,** 5075 (1953).
7226. Meyerson, S., McCollum, J. D., and Rylander, P. N., J. Am. Chem. Soc. **83,** 1401 (1961).
7227. Steele, W. C., Jennings, B. H., Botyos, G. L., and Dudek, G. O., J. Org. Chem. **30,** 2886 (1965).
7228. Good, W. D., Douslin, D. R., Scott, D. W., George, A., Lacina, J. L., Dawson, J. P., and Waddington, G., J. Phys. Chem. **63,** 1133 (1959).
7229. Meyer, F., and Harrison, A. G., Can. J. Chem. **42,** 2008 (1964).
7230. Kent, R. A., Zmbov, K. F., Kana'an, A. S., Besenbruch, G., McDonald, J. D., and Margrave, J. L., J. Inorg. Nucl. Chem. **28,** 1419 (1966).
7231. Kent, R. A., Ehlert, T. C., and Margrave, J. L., J. Am. Chem. Soc. **86,** 5090 (1964).
7233. Ehlert, T. C., Kent, R. A., and Margrave, J. L., J. Am. Chem. Soc. **86,** 5093 (1964).
7234. Grimley, R. T., Burns, R. P., and Inghram, M. G., J. Chem. Phys. **35,** 551 (1961).
7237. Ackermann, R. J., Rauh, E. G., and Thorn, R. J., J. Chem. Phys. **40,** 883 (1964).
7238. Colin, R., and Drowart, J., J. Chem. Phys. **37,** 1120 (1962).
7240. Scott, D. W., Berg, W. T., Hossenlopp, I. A., Hubbard, W. N., Messerly, J. F., Todd, S. S., Douslin, D. R., McCullough, J. P., and Waddington, G., J. Phys. Chem. **71,** 2263 (1967).
7241. Moore, C. E., NBS Circ. 467, U.S. Government Printing Office, Washington, D.C. 20402, Vol. **I** (1949), Vol. **II** (1952), and Vol. **III** (1958).
7255. Bjellerup, L., Acta Chem. Scand. **15,** 231 (1961).
7256. Lautsch, W. F., Trober, A., Zimmer, W., Mehner, L., Linck, W., Lehmann, H.-M., Brandenburger, H., Korner, H., Metzschker, H.-J., Wagner, K., and Kaden, R., Z. Chem. **3,** 415 (1963).
7257. Gowenlock, B. G., Kay, J., and Majer, J. R., Trans. Faraday Soc. **59,** 2463 (1963).
7258. Nickerson, J. K., Kobe, K. A., and McKetta, J. J., J. Phys. Chem. **65,** 1037 (1961).
7259. Sellers, P., and Sunner, S., Acta Chem. Scand. **16,** 46 (1962).
7260. Long, L. H., and Sackman, J. F., Trans. Faraday Soc. **52,** 1201 (1956).
7261. Green, J. W., Blue, G. D., Ehlert, T. C., and Margrave, J. L., J. Chem. Phys. **41,** 2245 (1964).
7262. Krikorian, O. H., and Carpenter, J. H., J. Phys. Chem. **69,** 4399 (1965).
7263. Kerr, J. A., Chem. Rev. **66,** 465 (1966).

9. Appendix 2. Table of Group Equivalent Values

Certain of the heats of formation in appendix 1 were estimated by the method of Franklin.[a] The group equivalent values used are listed here.

Group equivalent values for ΔH_f of ideal gas at 298 K, kcal mol^{-1}

Group	ΔH_f	Group	ΔH_f	Group	ΔH_f
$-CH_3$	−10.12		23		
	−4.93			$-C=O$	−79.8
				$-SH$	5.7
	−1.09			$-S-$	11.6
				$-S-S-$	10
	0.80		35	$-NH_2$	2.8
$-HC=CH_2$	15.00				12.0
 (trans)	17.83		−6		
					19.2
 (cis)	18.88			$-ONO$	−10.9
	16.89		−4	$-NO_2$	−8.5
				$-ONO_2$	−18.4
	20.19	$-F$	−45	$-CN$	29.5
				$-NC$	44.4
	24.57	$-Cl$	−10		
		$-Br$	2		−44
$=CH_2$	6.25	$-I$	15	$-NCS$	41
$=C=$	33.42	$-OH$ (primary)	−41.9	$-SCN$	48
$-C\equiv CH$	54	$-OH$ (sec.)	−44.9		34
$-C\equiv C-$	54	$-OH$ (tert.)	−49.2		
	22	$-OH$ (phenol)	−46.9		34
		$-OOH$	−21		
		$-O-$	−27.2		34
		$-O-O-$	−24	$-O\cdot$	8
	24	$-HC=O$	−33.9	$-O-O\cdot$	8
				$-S\cdot$	43
			−31.6		0
	23		−94.6		−35
					47
			−74		
					54

Correction factors for—

C_5 cycloparaffin ring	5.68
C_4 cycloparaffin ring	18.4
C_3 cycloparaffin ring	24.22
Adjacent  and groups	2.5
3 adjacent groups	2.3
2 adjacent groups	5.4
Resonance of radical with one C=C bond or aromatic ring	−19
Resonance of radical with 2 C=C bonds or aromatic rings	−30
Resonance of radical with 3 C=C bonds or aromatic rings	−39

[a] J. L. Franklin, Ind Eng. Chem. **41**, 1070 (1949); J. Chem. Phys. **21**, 2029 (1953).

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